

Harley Baumler  
Turkey Valley High School  
Fort Atkinson, IA  
Japan, Sustainable Agriculture

### **Bringing Agriculture into Urban Areas of Japan**

Sustainability. What comes to your mind when you think of the word *Sustainability*? I think of how I'm helping to make the earth more sustainable. Is it taking shorter showers, not using plastic bags, or walking instead of driving? By 2050 there will be 9.8 billion people walking this very earth. It is our job to figure out how to keep people fed, clothes on their backs and sheltered. In America, the future farmers will produce 70 percent more food than they do now. Some things people are already working on are using less water for useful tasks, creating and maintaining healthy soil, and minimizing air, water, and climate pollution. Farmers are trying to achieve this goal by rotating crops, planting cover crops, cutting down on or getting rid of tillage, applying integrated pest management (IPM), combining livestock and crop farms, and practicing agroforestry. Farmers are looking into how to plant efficiently and get bigger yields with the area they already have.

Over the Pacific Ocean lies Japan, a country that is made of 3,000 islands and is called an archipelago. It is about the size of Montana. Japan has 126.8 million people. Only ten percent of the population lives on a farm, which is commonly family-owned and operated. The population in urban areas reaches 115,920,900 while the rural population is 10,608,200. Japan has a parliamentary government with a constitutional monarchy. The prime minister of Japan is Naikaku-sōri-daijin. Only 11.5 percent of Japan's land is currently cultivated. Most of that land is found on the plains of Japan. The average farm size is 1.5 hectares, in comparison that would be 3.7 acres. The climate is subarctic in the north and subtropical in the south.

A typical family is about 2.4 people in a household. Their daily meals are at least one soup, three side dishes, and the main dish. This may include steamed rice, noodles, fish, tofu, natto, seaweed, and fresh cooked or pickled vegetables or fruits. The average Japanese person consumes over 150 pounds of fish a year. They purchase their food from supermarkets or convenience stores. They cook their food with ovens, stovetops, or grills. The average wage for full-time employees is \$37,800. This may be higher or lower due to experience, job type, or region. According to the OECD Better Life Index, Japan is the highest ranking country in personal security. Japan is above average in the following areas: income and wealth, education and skills, jobs and earnings, housing, and environmental quality.

Urban agriculture is a growing industry. Urban farms are supplying to 700 million city residents all over the world. That is one-quarter of the world's urban population. They use rooftops, empty lots, and gardens. Urban agriculture may include animal husbandry, agroforestry, aquaculture, and horticulture. Having urban farms helps with air quality in high pollution areas, improves health by bringing nutritious food into homes, and provides a social outlet for people who are involved with urban farming. Urban

farms bring in soil organisms, wild plants, insects, birds, and amphibians. Increasing urban farming can increase job opportunities. Horticulture can provide a job per one hundred square meters of land. The job may involve marketing, input supply, and value-addition from farmer to consumers. Urban farmers are learning to grow plants without soil. Instead of using soil, they use clay pellets to support the plants and rockwool for germinating the seed. Plants grow twenty percent faster without soil than they do with. Hydroponics tables have shown bigger yields in studies.

I have first-hand experience with some of the systems used in urban agriculture such as the bucket system, fodder table, and a hydroponics table. At my school our agricultural education program invested in these systems. The fodder table can grow fodder five to six inches in length in less than a week. It is a very nutritious grass for both livestock and even people. When we harvest the fodder, we roll and put it in bins and give it to local farmers. Instead of putting it into bins right away we sometimes put it through a juicer and mix some fruits or vegetables with it. Rather than drinking coffee or energy drinks daily, consumers could drink fodder juice which has a higher nutrient value. In our bucket system, we are growing peppers, lettuce, tomatoes, and cucumbers. We use clay pellets to support the plants, like the soil would. We have growing light on for twelve hours a day and then they are off for another twelve hours. We have the lights on a timer and they turn on and off when needed. The way we water the plants in the bucket system is having the water pass through every twenty minutes. During the twenty minute cycle the plant can get the nutrients and water it needs. After the plants soak up what they need, the water and nutrients the system flushes back out into a supply reservoir and this occurs four times a day. When the lettuce is ready to harvest, we cut it off and consume the product that we produced. With the hydroponics table, water runs through it constantly. We have tomatoes and peppers growing in it. Where the water runs through the plants' roots, it is sealed to prevent evaporation. The plant only takes up the water and nutrients they need. In addition to saving water, one of the benefits of using a hydroponics table is that we can control the pH levels.

There are so many opportunities for consumers to produce their own food. Some of them can be made with PVC pipe, plastic totes, metal, and a lot of hard work. Some plants to start with are herbs, strawberries, tomatoes, hot peppers, lettuce, spinach, and kale recommended by *The Spruce* (an inspirational on how-tos home decorating and gardening). Vegetables have a short reproductive cycle and can be harvested within sixty days after planting.

Japan has one of the lowest self-sufficiency rates out of industrialized countries. Japan has no natural gas or oil. One of the top natural resources is limestone. Some other natural resources are titanium and sheet mica. They import in coal, natural gas, oil, big amounts of iron, and other metals. Japan imports sixty percent of their food. One of the top crops is rice. All the rice is grown in Japan but Japan doesn't have enough arable land to grow soybeans and wheat. In Japan, there are two cropping systems. Irrigated fields are used for rice production and non-irrigated fields used for the production of vegetables. Some of the rice fields are terraced in the mountains. If they are not in the mountains, then they are in lowlands or plains. Machinery is not very popular due to the fact that producers can not harvest all the crops because a

lot of the fields are uneven or not square. They also plant in terraces, ditches, and embankments. Most producers manually harvest and plant by hand.

Urban agriculture has already made an appearance in Japan. Twenty-five percent of the output of agriculture in Japan is from urban agriculture. Some companies bring urban agriculture into the office. After the harvest the produce goes right into the company's cafeteria. Tokyo houses 13.2 million people. Eighty percent of the food gets imported from other countries. Urban agriculture is a way for Japan to alleviate their dependence on other countries.

Agriculture in Japan is facing another issue. The age of farmers is rising. In order to continue providing food to consumers, farmers need to teach and communicate with the younger generation on what it takes to produce a healthy and safe product for Japanese consumers. If the younger generation would get involved and learn from the older more experienced farmers, they can pick up where the older farmers left off. A few of the experienced rice farmers are inviting agriculture majors to their farms to get first-hand experience.

By making urban agriculture more popular in Japan, the citizens would save money by growing their food and not importing as much. The food would have no preservatives and would be fresher than imported food. Before fruit and vegetables can be transported to Japan, they have to go into a plant quarantine. Upon being transported they have to have a quarantine certificate. When produce makes the trip overseas and bugs are found on the vegetables and fruits, the produce needs to be disinfected with certain chemicals.

You may be wondering how people get started with an urban garden or community garden. I would recommend starting small. You don't want to overwhelm yourself with plants. Especially if you work a full-time job. Next, choose what plants you want carefully. Green, leafy plants are going to be easier to grow than fruits. Buy seedlings, so you're not completely starting from scratch. Consider light exposure. If you are planting in a shadier spot, choose herbs that are shade tolerant.

The way I'm taking action is starting small with my community. A way I'm promoting it is using social media as a tool to educate consumers about urban agriculture. Urban agriculture has so many benefits as I listed above. My end goal is to reach so many people that it ends up reaching Japan. I'm still learning about urban agriculture and all of its aspects. My main goal is to grow my knowledge so when consumers are asking questions, I can answer them to my best ability.

Our high school classes invite the elementary classes to the hydroponics room. The agriculture students teach the elementary students about systems and development of plant growth. This allows us to get the word out about how urban agriculture can be sustainable. As my FFA chapter's reporter, I write articles, post on social media, and work closely with the member who is running the chapter's website. I also serve as Fayette County Teen Miss United States Agriculture. It is more than a title for me; it is a way for me to show my passion for agriculture. One thing I have to do is choose a platform. My platform is *Ask a*

*Farmer.* I am encouraging farmers to explain their daily lives to people who have no idea what happens on a farm. I am also getting the message across that you don't need a plot of land to be self-sufficient. You can make low-cost systems for less than 50 dollars and start growing products for your own consumption. It just takes educated, positive, and self-driven people to inform and teach others how to be self-sufficient. I found my passion this year through urban agriculture. I know I can make a difference by educating others on how sustainable agriculture can improve the lives of many.

Urban agriculture enhances sustainability by providing for consumers, producing a safe product, and teaching people about agriculture. The world's population is growing day by day. How are you doing your part to make sure that we can provide for those 9.8 billion people by 2050? One way is to educate people on the possibilities that exist for sustainability. We need people to recognize that they are capable of producing a product no matter where they live. People all across the world are uneducated on what happens with agriculture. It is up to producers to get the word out about the possibilities that exist. Sustainability can be looked at as a problem, but I prefer to look at it as an opportunity to educate, promote, and supply the world with healthy food options.

There is no future without agriculture, and there's no future without you.

Workman, D. (2020, March 6). Japan's Top 10 Exports. Retrieved from <http://www.worldstopexports.com/japans-top-10-exports/>

Japan Meteorological Agency. (n.d.). General Information on Climate of Japan. Retrieved from <https://www.data.jma.go.jp/gmd/cpd/longfcst/en/tourist.html>

Crop Explorer for Major Crop Regions - United States Department of Agriculture. (n.d.). Retrieved from <https://ipad.fas.usda.gov/highlights/2012/08/Japantrip/>

Japan - Agriculture. (n.d.). Retrieved from <https://www.nationsencyclopedia.com/Asia-and-Oceania/Japan-AGRICULTURE.html>

D'Anna, C. (2020, January 6). Learn the Basics of Hydroponics: the Most Efficient Gardening Method. Retrieved from <https://www.thespruce.com/beginners-guide-to-hydroponics-1939215>

Green Tokyo: 5 cool examples of urban agriculture. (2013, September 1). Retrieved from <https://soraneews24.com/2013/09/01/green-tokyo-5-cool-examples-of-urban-agriculture/>

Kids Web Japan. (n.d.). Retrieved from <https://web-japan.org/kidsweb/explore/economy/index.html>

Hays, J. (n.d.). AGRICULTURE IN JAPAN: OLD, PART TIME FARMERS, SMALL FARMS, HIGH-TECH METHODS AND IMPORTS AND EXPORTS. Retrieved from <http://factsanddetails.com/japan/cat24/sub159/item941.html>

FAO's role in Urban Agriculture. (n.d.). Retrieved from <http://www.fao.org/urban-agriculture/en/>

McCoy, M. (2019, May 28). 5 Tips To Start An Urban Garden. Retrieved August 27, 2020, from <https://www.wpr.org/5-tips-start-urban-garden>

Information regarding Import Procedures for Food. (n.d.). Retrieved August 26, 2020, from [https://www.jetro.go.jp/ext\\_images/mexico/mercadeo/ImportProcedures\\_EN.pdf](https://www.jetro.go.jp/ext_images/mexico/mercadeo/ImportProcedures_EN.pdf)