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Estonia, Sustainable Agriculture

Estonia: The Development of the Diet

"Civilization as it is known today could not have evolved, nor can it survive, without an adequate food supply." -Norman Borlaug

Dr. Norman Borlaug, the father of the Green Revolution and winner of the 1970 Nobel Peace Prize, spent his life working towards a solution for the disadvantaged people of the world. His work led to a stronger sustainable agricultural environment in Mexico, India, Pakistan, China, and multiple African countries (LLC - Ames, 2009). To continue Dr. Borlaug's work on sustainable agriculture and self-sufficiency in other countries, I would like to propose the idea of building family greenhouses in Estonia.

Malnutrition is a world crisis. While 462 million adults around the globe are concerned about their access to food sources, those 1.9 billion adults who have enough to eat should be concerned with the amount of micronutrients they are consuming (World Health Organization, 2018). Foods that may seem like a simple or easy solution at the time won't be beneficial in the long run. People who lack a mixed diet of fruits, vegetables, grains, meats, and dairy products are more likely to develop health problems in the future than those who are conscious of eating a variety of nutritious foods (Shenkin, 2006). The consumption of large quantities of fibrous or nutritionally monotonous foods can cause a person to become overweight due to little variance in their diet.

Being cognizant of nutrient intake can help regulate the body's systems. Twenty percent of all cardiovascular disease occurrences can be linked to inadequate intake of fruits and vegetables (World Heart Federation). Cardiovascular disease affects the condition of your heart, and can cause an irregular heartbeat, strokes, and heart attacks (Mayo Clinic, 2018). The consumption of monotonous diets for a multitude of years can lead to a decline in one's overall health (Shenkin, 2006). Another risk of not consuming nutritionally rich meals is vitamin deficiency. The lack of vitamin D in a person's diet can weaken and warp bones, allowing the possibility for a person to be disabled for life (Mayo Clinic, 2015). This nutritional dilemma is not only happening in third-world countries, but more developed countries as well (Shenkin, 2006).

Estonia is a relatively small northern European country, located near Finland, Russia, and Latvia, with a limited agricultural sector. Out of the 45,228 square kilometers of land that make up Estonia, (slightly smaller than the state of South Carolina in the United States), only around 9,950 square kilometers, or 22%, of it is used for agricultural purposes, as forests make up 50% of the country and the rest is consumed by urban development (World Factbook, 2018; AQUASTAT, 2016). Approximately two-thirds of all 1,251,581 Estonians live in apartment buildings, the majority built following the end of WWII (Britannica, 2018). Due to the astounding number of urban dwellers, only roughly 3%, or 1 in every 37,547 people, involved in the Estonian labor forces are dedicated to agriculture (Estonica Agriculture and Forestry, 2012).

As a result of the country's proximity to the Baltic Sea and the Gulf of Finland, Estonia experiences moderate winters and relatively cool summers and presents no need for irrigation systems (Eurostat, 2012). The northern regions of Estonia are flat and the southern regions are hilly, but the main country itself is marshy with bogs and lowlands (World Factbook, 2018). This change in climate allows for the

growth of a variety of products. Estonia's primary agricultural commodities are dairy products, grains (like barley and wheat), hay, potatoes, and fish from its maritime regions (Export.gov, 2017). All of these products are used in traditional Estonian meals.

Authentic Estonian cuisine consists of rye breads, stews, pickled or preserved fruits and vegetables, potato porridges, pearl barley, head cheese meats, and salt herring (Britannica, 2018). The diet of Estonians is rich in carbohydrates and fibers, with few fresh fruits or vegetables. This scarcity of readily available fresh produce impacts the health of the citizens. Instead of becoming a regular part of an Estonian citizen's diet, the imported produce becomes a delicacy. During holiday meals in Estonia, apples, a common lunch-time snack in American schools, will be offered as treats.

Reliance on other countries for products which cannot be produced domestically can be a cause of economic strain in Estonia. Most of Estonia's imports originate from countries such as Finland, Germany, Sweden, Latvia, Lithuania, and the United States (World Factbook, 2018). Estonia relies heavily on trade with these countries, exposing them to the uncertainty of volatile foreign markets and political stress as the process of importing fresh produce can be costly. Once in Estonia, the produce will have to endure ground transportation through the hills of northern Estonia. By the time an imported product has reached the shelf of a grocery store in Estonia's capital of Tallinn, it could have easily travelled close to 1,000 miles. Not only are transportation costs expensive, but up to half of the original payload may have spoiled.

The risk of damaging or destroying products in transport can be expensive, not only for the producer, but for the consumer as well. If a product were to be spoiled in transit, the supply of the viable produce would decrease, driving the consumer price up to cover the cost of shipping. The increased price would discourage buyers, especially in a low-income household. An average Estonian monthly salary is around €810 euros, roughly $1,000 USD, placing approximately 21% of all Estonians below the poverty line (Estonica Labor Market, 2012; World Factbook, 2018). Thus, fiscally conscious families may choose shelf-stable goods over their fresh produce counterparts.

In order to reduce economic strains, food waste, and to improve the diet of Estonians, I propose the building of family greenhouses for the purpose of growing fruits and vegetables locally. This would help to reduce Estonia's trade and market dependency, engage more people in agriculture, and improve the overall health of the country's citizens.

Instead of struggling to create quality products in naturally marshy and boggy areas, which are not hospitable to fruit and vegetable plant growth, a greenhouse is the perfect environment for growing fruits and vegetables. Having a greenhouse would open up the opportunity to supply fresh, nutritious foods over a longer agricultural growing period, especially throughout the cold winters. Growing vegetable plants and fruit bushes or small trees at staggered time frames in these greenhouses would allow fresh produce to be grown all year round, creating a more readily available and easily accessible way to have fresh foods.

The benefits of greenhouse gardening are a reduced need for pesticides and herbicides, which is another expense for the farmer. Any weeds that do grow inside the greenhouse are easy to control in the small area, and can be managed by hand. With a properly sealed greenhouse, there are no worries about Estonia's natural wildlife interfering or destroying any of the crop. The amount of bugs that might be harmful to the plant life, could be controlled by having a greenhouse. In addition, greenhouses are easy to access and manage by any age or point in life, making them a great learning tool for every person.

For example, the construction of a 4ft by 8ft by 6ft greenhouse with a single door on the broad wall would provide three sides of shelving for plants to grow and a small standing area to access them. To support the greenhouse itself, plastic PVC pipes could be connected together via appropriate corner fittings, and then the pipes would be filled with small rocks and dirt for better stability. The greenhouse will be enclosed with a plastic tarp. Over time, as the greenhouse becomes successful and helps the owner profit, the person could invest in a sturdier and more long-term greenhouse. Then, the farmer might apply more advanced technologies such as hydroponics or aeroponics.

The shelves inside the greenhouse would be adjustable to accommodate for the growth of taller plants such as sweet corn or tomato vines. To create and maintain a controlled system, the door would be able to be completely sealed shut. To monitor and control temperature in the greenhouse, closable ridge vents or slatted vents could be installed on the roof (Bucklin, 2018). If desired, a thermostat and automatic watering system could be installed. A traditional-style greenhouse could be used in rural areas, whereas in more compact urban areas, vertical farming may be optimal (Despommier).

Having fresh produce available locally will not only serve Estonians economically, but environmentally as well. With the strong influence of modern social media, the demand for fresh and unprocessed foods is becoming more prominent. Fruits and vegetables grown locally have little to no preservatives, unlike produce that has been imported. Produce harvested from a family owned greenhouse would require less heavy packaging than that needed for long distance shipping. This makes the product friendlier to the wants of the consumer and friendlier to the environment. Instead of wasting a large percentage of the crop by damage during transport, the Estonian people would be able to access these products in larger quantities at a lower cost. What was once seen as a special treat is now a fresh, micronutrient-packed part of their daily diet.

Implementation of the greenhouse project will focus on schools and the building of learning communities. The first greenhouses will be constructed at vocational schools, where the students will be allowed to participate in the building and interior planning of the greenhouse. The installation of greenhouses at schools would be beneficial as it would introduce students to agricultural education, the understanding of where their food comes from and the knowledge that a consistent and healthy diet is extremely important for their physical and mental development (Beginning of the End of Malnutrition, 2018). The foods grown by the students could be incorporated into the school lunch program. Children who eat nutritious foods excel in the classroom, as they can focus better on school work (School Food and Nutrition). This directly translates to higher literacy rates and improved test scores, which correlates to academic and professional success. Students would be able to enjoy physical activities, another way to stay healthy, after eating a well balanced diet and not suffer from fatigue (School Food and Nutrition).

Once the construction of the greenhouse is complete, the community will be invited to see, experience, and learn about the production of fruits and vegetables locally through an artificially extended growing season. The students who participated in the assembling of the first greenhouse can go on to assist their parents, neighbors, and friends in constructing their own greenhouses.

Partnering with the Agricultural Entrepreneurship Initiative (AgEI) program at Iowa State University could play a key role in executing this project. The AgEI focus is to help college students develop agricultural related business skills. In the past, AgEI has sent small teams of students to foreign countries where they are able to implement projects they have developed (AgEI, 2018). The students would be able to help create and design the greenhouse and then educate the Estonians about the benefits of greenhouse farming. The Iowa State students would mentor the vocational school teachers and students so the learning communities would be secure after the initial phase of implementation.

Students who are interested in agriculture would have the ability to test their skills in a real-life, hands-on environment, and learn how other cultures interact along the way.

On-site education and addressing of questions will help build confidence among the growers. These producers will be the mentors in the community for the next group of growers, and as building community experts they will help ensure the successful continuation of the program. To students, these skills are transferable, and could inspire graduates to pursue careers as nutritionists, marketers, or any other agricultural based jobs (Beginning of the End of Malnutrition, 2018). As a result of these greenhouses and their accompanying educational programs, the agricultural industry in Estonia could become more robust and secure.

Ongoing educational support is a critical component of any new learning experience. NatureFresh Farms is a leading greenhouse business based in Leamington, Ontario. A mentoring relationship with NatureFresh would be strategic as Estonia has approximately the same climate as Canada. NatureFresh has a public farm-to-table education initiative and teaching team in place specifically for assisting small greenhouse growers. Through their Greenhouse Education Center, NatureFresh is able to answer questions and provide agricultural support (NatureFresh Greenhouse Education Center, 2018).

To provide financial support, I would approach Lutheran World Relief. Estonia has approximately 125,000 Lutherans (World Factbook, 2018), although financial support is not contingent on personal beliefs. The driving force of Lutheran World Relief's agricultural assistance is to support the development of farmers' organizations and networks (Lutheran World Relief). The organization focuses on expanding food availability and access by increasing agricultural production. Lutheran World Relief supports initiatives which provide education and aid to farmers, who during periods of growth need additional personal financing by acting as a liaison between the producer and the banking system.

The idea of helping Estonia stems from recognizing that lesser known countries still have difficulties in their societies. Although there are more impoverished areas in the world, all organizations should be aware of the hardships of areas that are not commonly identified by the media. In securing Estonia as a self-sustaining country, it can then use its excess aid and products to help others who struggle. Turning fruits and vegetables into more commonly available products would in turn impact the diets of the general Estonian public and people in nearby countries. Other import-reliant countries in the surrounding region will be able to access the benefits of any surplus fresh produce from the Estonian greenhouses, or perhaps implement the greenhouses in their own countries. In mending nutritional deficiencies in key small countries, such as Estonia, those countries can then combine forces to join the fight against hunger elsewhere, reducing the remaining number of countries who still need help.

Malnutrition is a global issue that can be addressed at a personal level by empowering people to become educated and involved in their own diets. Though this paper focuses on the citizens of Estonia, this solution is adaptable for multiple countries. To continue to make an impact across the globe, the concept of small greenhouses brings the possibility of good nutrition into the consumer's own backyard. Through education, and eradicating nutritional deficiencies through greenhouses, we can spark a change that will further the plight to end world hunger.

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