

Sarah Flanagan  
Cedar Creek High School  
Egg Harbor City, New Jersey, America  
Iceland, Sustainable Agriculture

### **Iceland: The Race to Reduce Imports**

Imagine a perfect world; no malnutrition, no conflict, no global warming. Every single person out of the 7.8 billion population on Earth would have access to food, water, and all of the necessities of life, without a worry about where their next meal will come from. Today's Earth is far from perfect; however, it doesn't have to be filled with millions of people wondering when they will be able to obtain fresh food and water. Even though many of the countries experiencing these problems are still developing, the developed countries should not be forgotten. Iceland is the perfect example of a developed country that is at risk of becoming food insecure. Just about the size of Kentucky, Iceland is an Island located in the North Atlantic Ocean. Mainly made up of ice and volcanoes, the country only has 121,000 arable acres (McCauley & Osterman). With a population of 342,414 people living mostly around the capital Reykjavik, the high rate of imports and reliance on other countries for food imports makes Iceland an area of concern in terms of food security (Worldometers, 2020).

As the third richest country in the world, living conditions are excellent and the citizens are highly educated. About 94% of the population lives in urban areas with many working in the major fishing and aluminum smelting industries (World Bank, 2020). The average salary is 410,000 ISK per month (Stotz, 2021); about 3,300 US dollars and the average house costs 40 to 50 million ISK or \$382,500 to \$478,130 (Chapman, 2019). The houses in Iceland are usually colorful to make up for the colorless climate. Averaged two to three stories high, the houses are built with thatched roofs and house two to three people (Chapman, n.d). With a TFR of 1.97 and an average household size of 2.57 people, the families in Iceland are smaller in size; however the population is still growing steadily (Index Mundi , 2020). The average family is healthy and wealthy and has access to clean water, electricity, safe roads, and markets. According to the OECD better life index, when asked the question "how is your life in general" 76% of respondents "reported having good health" which is 7% higher than the OECD average of 69% (OECD, 2017). A great healthcare system, access to clean water, a healthy diet of fish and hearty meats, and healthy lifestyles contribute to a healthy population. Iceland doesn't just have a healthy population, but has the second healthiest population in the world, followed behind Italy (Iceland Magazine, 2017). Icelanders enjoy lots of fish on a daily basis including haddock, cod, and Atlantic wolffish, since the country is surrounded by water. Traditional dishes include Harðfiskur, Plokkfiskur which is fish stew, and Humar which is icelandic lobster. Lamb, bread, root vegetables and coffee are country staples as well (Lonely Planet, 2019).

Iceland; also known as the land of fire and ice, is no stranger to dealing with adversity. With 11% of the country covered in glaciers and home to some of the most active volcanoes, farming and cultivating land is not an easy task (McCauley & Osterman, n.d ). Volcanoes could erupt causing smog and ash to cover the sun and crops. Glaciers could melt causing massive flooding, destroying acres of farms. The cooler temperatures make farming simple fruits and vegetables difficult; however, root vegetables, potatoes, and corn thrive in the boreal biome. Due to the struggles in cultivating land and growing crop staples, Iceland relies heavily on imports to feed its citizens.

Relying on imports for certain food products is not a problem or cause for concern. Countries like the United States rely heavily on imports for tropical fruits and vegetables. However, when the imports out way the exports tremendously then there is a sign of trouble. In 2018, about 7.79 billions dollars was spent on imports compared to 6.67 billion dollars made in product exports. About 11% of all Iceland's imports are food and drink related, costing the country over 7 million dollars (OEC, n.d). Iceland itself

produces about 50% of its own crops (Jóhannsson, 2011). This means if there was a total shutdown from the rest of the world, Iceland would not have enough food to support its country for a long period of time.

Let's apply meaning to all of the factual information above. If Iceland were to rely on domestic agriculture alone, there would be very little variety in food production. To create more variety and add nutritional value to the dishes, imports are necessary. However, in the last few decades Icelanders have experienced more cultural dishes and want to bring the rest of the world's pallets to the traditional fish and meat country. This push towards non-traditional food has increased the need for imports. The top produce imports include coffee, fruits, vegetables and wheat and the top food imports include animal food, baked goods, flavored water, wine, and rolled tobacco. Most of these imports come from Germany, Norway, Netherlands, Denmark, and the United States of America (OEC, n.d).

Four out of the five main importing countries are located all within the same area in Europe. If Europe were to become involved in a war or if a pandemic were to break out, the importation of crops would have to slow or even halt causing a major decrease in food availability in Iceland. Crop failure could occur due to the rapid rates of climate change and diseases could break out in certain crops causing a shortage. Both of these incidents lead to increased food prices which will increase the amount of money spent on imports. Iceland had witnessed a food security scare during the Icelandic financial crisis of 2008. The collapse of three major banks in Iceland caused the value of the króna to plummet and put the country into a state of disorder. Many Icelanders began storing food and many markets went bankrupt from not having enough money (Jóhannsson, 2011). The financial event may not have caused food importation to stop; however, it showed the lack of preparedness within the country and the strong dependence on other countries.

According to a study performed by Orri Johannson in 2011, 41% of the participants had never heard of the term food security. This is alarming since food security is a real problem that can affect every country. The same participants were asked whether they have a private garden or access to one. The results; 34% answered yes and 66% no. When split into whether the participants live in rural or urban areas 67% of the rural respondents answered yes while only 30% of the urban respondents answered yes (Jóhannsson, 2011). In 2016 another food security survey was given to Icelanders of different backgrounds and ages by Holly Johanna Jacobson, an MIT student. The results showed no change from Orri Johannson's original survey. The participants were still either not very concerned with food security in Iceland or not aware of their situation (Jacobson, 2016). It is clear that the citizens of Iceland are too reliant on food from other places and are not well informed on the idea of food security. Even though the geography of Iceland causes difficulties in farming, it doesn't mean that farming cannot happen and that the country will have to be stuck eating fish and lamb. Iceland can better inform its citizens about the agricultural problems faced and come up with solutions on how to make use of the glacier covered land.

Iceland has a strong belief in equal education for everyone which is a motto every country should have. Almost 100% of children attend school and many further their education through college. Children between the ages 6 and 16 are required to attend school and may continue their education further. The country has eight universities including the University of Iceland and one private school. To top off the high education value in Iceland, all schooling is free including college (Inspired by Iceland, n.d). On the outside, Iceland is a very strong country to whom many other countries look up to. On the inside, the rough climate and geography poses many hardships which affect the economy and well being of the country.

Iceland's strong belief in education can be used to teach the country's citizens about the current food security issues and inform them of the potential consequences that are just around the corner. The studies show that nearly half of the population has never heard of the term "food security" and the country is not doing enough to change these results (Jóhannsson, 2011). Since education is highly valued in Iceland,

integrating lessons, programs, and classes about food security into schools can help better educate the country's population and make them more proactive. Lessons and classes can include, but are not limited to, educating the population on learning how to farm in difficult conditions, how to be better prepared in case of a food security crisis, and about the current food status of Iceland.

One of the main ways to make a difference in a country is through education. For many countries, education is not a main priority; therefore, educating their citizens about the country's complications is not a great solution. However, almost 100% of children go to school in Iceland and many continue their education further making education a simple and easy solution. Children are learning about mathematics, language arts, and science in school which are all important subjects. Food security is a subject just as important as the rest so why not use the vast platform of education to strengthen the cause? If very few know about how Iceland's geographical hardships affect agriculture or about how the vast amount of food imports affects the security of the country, then no one will take action and make a difference. One simple solution can have a grand impact on a growing situation. Integrating food security in Iceland into their schooling systems, can spread awareness and help the country push towards growing more crops at home and away from importing unnecessary items.

Adding food security education into the school system will educate children, teenagers, and young adults; however, how can the country successfully educate the rest of the population? Introducing public service announcements is a great way to spread awareness to the population who is not in school. Whether the PSA's are shown on the television, billboards, or in magazines and newspapers, they will quickly and efficiently shine light on Iceland's food insecurities. The main topic of the public service announcements will be about the high imports from other countries. What many Icelanders are unaware of is if their country could no longer get in contact with the rest of the world, whether it's because of a war or a different conflict, Iceland does not have enough food to support their population for a long period of time. The major dependence on imports from Germany, Norway and other European countries is a choice that Iceland's government made; however, by educating the Icelandic adults, a push towards sustainable agriculture in the country can be made possible.

The public service announcements will inform the public on where Iceland's food and drinks come from, what would happen if agricultural imports could no longer be made, and about how implementing sustainable agriculture and greenhouses will greatly benefit the country and generations to come. Iceland is one of the richest countries in the world and because of this many Icelanders feel their country is safe and prepared. Even though Iceland is wealthy, the country can easily lose its wealth if import prices drastically climb and they have to continue importing food or if another collapse of their economy occurred like during the financial crisis of 2008. Spreading awareness through PSA's can help push the government towards reducing reliance on other countries and can help prevent a greater food security problem in the future.

Tons of work goes into creating public service announcements between finding a set, hiring actors and actresses, and filming the clip. Luckily for Iceland there are the Food MythBusters. The Food MythBusters are a non profit organization who make short clips and videos informing people nationally and internationally about the biggest myths in sustainable food production (Food Mythbusters, 2019). With the help of this non profit organization, short clips and public service announcements can be made to inform Icelanders about pushing towards sustainable farming and importing less packaged and unnecessary foods. The Food MythBusters videos are backed by research, very informative, and keep the audience engaged. One of their videos addresses the question of *Do we need industrial agriculture to feed the world?* The short video dives deep into the negative effects of industrial agriculture and how farmers feel they either need to change their ways and go industrial or stop farming completely. The video is easy to follow and easily understood. Partnering with the Food MythBusters to create short films like industrial agriculture can be a great way to educate Icelanders and push towards a more sustainable country.

In addition to funding public service announcements, the Food MythBusters organization can partner with schools in Iceland to help promote education on sustainable agriculture. Much like how children have assemblies, schools can show the Food Mythbusters videos in class to educate their children. The organization started making short videos to educate citizens around the world, so it would be perfect to incorporate these educational videos into the schools curriculum. The videos would be an easy and cheap way to promote sustainable agriculture while keeping the children entertained and happy and while helping a small non profit organization grow.

Asking the Food MythBusters to educate an entire nation is an enormous favor to ask. One way to ensure the organization does not become overwhelmed is to create a branch or sector off of the organization specifically for Iceland. Icelanders can join the branch leading to an expansion within the organization. The greater the organization is in size, the easier it will be to create videos, public service announcements, and perform in-school assemblies. Once more of the population is educated, then classes can be integrated into schools and individuals other than the Food MythBusters can start making videos as well. The Food MythBusters also have partnerships with a few other organizations such as the HEAL Food Alliance. The HEAL Food Alliance's mission is to "create food and farm systems that are healthy for our families, accessible and affordable for all communities... while protecting the air, water, and land we all depend on" (HEAL Food Alliance, 2020). This organization already partners with the Food MythBusters and might be another good partner in the fight against food security within Iceland. With two organizations tackling the issue together, the responsibility of educating a nation will be shared and there is a better chance the Icelanders will become educated.

The next big situation to tackle is funding for the non-profit organization and for education. Typically funding for a non-profit organization comes from either the government or from donations by the public through fundraisers. For the Food MythBusters specifically, funding can come from the schools and from the public through donations. The government can also fund, but their money will come as a last resort since the Icelanders do not need and will not be for increased taxes. As mentioned before, Iceland is the third richest country in the world, so with this in mind, funding should not take a major toll on the country.

Now that Iceland's population is well educated on the current food security situation, the next step is to put the knowledge to action. Due to Iceland's harsh environment, only 120,000 acres are available for agriculture (Index Mundi , 2019). On these acres of land only certain types of crops can survive, some of which include root vegetables, cereal grains, carrots, and cabbage. The limited amount of crops that can be grown should not stop the country from exploring alternatives. Greenhouses have been used to grow fruits and vegetables like tomatoes in the colder climate; however, the country has not invested in a large use of greenhouses to grow crops. Developing a greenhouse industry for agriculture can boost crop production and allow tropical fruits and vegetables to grow in a cool, icy, climate.

Canada and The Netherlands have successfully built a greenhouse industry that has continued to grow and thrive over the years. Interestingly enough, Canada is the second leading exporter of tomatoes in America and this is all possible thanks to greenhouses (Charles, 2016). These heated structures can be built almost anywhere and supply many of the crops that Iceland gets imported. Greenhouses can turn a large amount of uncultivated land into a center for crops. By growing produce like apples, pears, citrus fruits and different vegetables, the country can cut down on its produce imports by 15.32% (OEC, n.d). This increase in locally grown produce will allow the country to cut down on import costs along with allowing them to become more food secure.

Growing seeds in Iceland is a hard task and most plant seeds are imported much like everything else. Because of this, creating a greenhouse industry will be more difficult since greenhouses rely on seeds to grow. The Organic Seed Alliance is a non profit organization that provides seeds to farmers and farms

internationally. Their mission is to “advance ethical seed solutions to meet food and farming needs in a changing world”(Loriz, 2019). The Organic Seed Alliance (OSA) can provide the seeds Iceland needs to start a greenhouse industry without the high costs of imports. These particular seeds are crossbred and adapted to withstand harsh conditions while still keeping their organic nature. The OSA can partner with farmers to provide them with seeds and can partner with the Farmers Association of Iceland to fund the greenhouse project and bring sustainable agriculture to the country.

The country as a whole presents two separate, yet interconnected issues contributing to the potential of a food security crisis; one issue being the lack of awareness within the Icelanders about the hardships Iceland's cultural landscape presents, and the other issue revolving around the lack of arable land for sustainable agriculture and domestic farming as a whole. Since Iceland's geography is not the most suitable for sustainable agriculture, the nation needs to find ways to adapt and overcome the situation. The nation cannot find ways to combat this problem, if the population is not educated or aware of the food security threat. For the most part, Icelanders are not aware of how their country's geography contributes to food insecurity, and since they don't see a problem, there is no point in trying to fix something that in their eyes is not broken. As more time goes by with the population being left uneducated, the more severe the situation will become. Developing a greenhouse industry can bring food and nutrition to the country and reduce imports and educating the population can prevent the country from becoming food insecure in the future, but the only way the two solutions will work is if they work in conjunction with each other, just like how the two issues mentioned above are interconnected. The country can continue relying on large imports for their food, or they can educate themselves and discuss solutions on how to bring sustainable agriculture to a country whose cultural landscape won't support it.

As the world's population continues to increase, food is becoming even more scarce and more countries are becoming food insecure. Iceland has a relatively small population; however, the increasing tourism industry is causing the country to see a rapid boost in population. The more people the country has to feed, the more agricultural imports needed, the more money the country will need to spend. Iceland is trapped in a positive feedback loop, but there are ways out of it. With some help from non profit organizations, education, and the use of greenhouses, Iceland can become a very food secure country and find a way out of the feedback loop. Picture this; in 10 years from now instead of being a major importer of agricultural goods, Iceland can become a major exporter because of the new greenhouse industry. In schools, children will be learning about sustainable agriculture and food security and grow up to share their knowledge with other struggling nations. Adults will be more aware of the term food security and what that term means to them. The country as a whole will be more educated and can be the shining light in the darkness by offering hope to other countries who have high imports too.

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