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Norway, Sustainable Agriculture

How fish poop could help Norway increase sustainable agriculture and rely less on food imports

There are 783 million people throughout the whole world and 1 in 10 are experiencing severe food insecurity. (Omer, 2024) Currently, roughly only 2.5% of Norway's population of 5.4 million people are experiencing food insecurity. (Crumb, 2023) Even though Norway is currently not experiencing very much food insecurity, Norway relies heavily on food imports from other countries to feed its population. Without relying on imports, Norway cannot feed 60% of its population. (Kristiansen, 2023) With everything that is going on in the world right now such as the war in Ukraine, and the possibilities of another worldwide pandemic like Covid-19, Norway should become more food independent. To become more food independent and not rely on food imports as much as they currently do, Norway should utilize their fish trimmings and fish poop as fertilizer for their fields to increase crop production on the limited land that is available for farming.

The fertility rate in Norway is 1.57. This means the average Norwegian woman will have around 2 children. (The World Factbook, 2024) It has been found that in households with at least one child under 15 years old, food insecurity is 2.2% higher. (Reeves, Loopstra, & Tarasuk, 2021) Norway has a population of 5,509,733. (The World Factbook, 2024) The average population of countries in the European Union is 16,676,279. (Worldometer, 2023). Norway has a much smaller population compared to the average European Union country. The growth rate of Norway is 0.59%. Approximately 84% of the population of Norway lives in Urban areas. (The World Factbook, 2024) Because Norway has a relatively small population and so many of Norway's population live in urban areas, a solution to the food import problem needs to be a solution that does not need a lot of extra people to make it happen. The average poor family in Norway is most likely to be an immigrant family with children and is often a single parent family. (Wright, 2015)

Gender roles in Norway are shifting. Norway has one of the highest rates of women working outside of the home with over 70% of women being employed. With more women working, other gender roles are changing as well. Men in Norway are now taking a larger role in taking care of children. Norway is now giving men parental leave, along with encouraging men to participate more in raising their children. (Percival, 2023) Because Norway is more progressive in nature, they are going to be more likely to look for a solution to food insecurity that deals with environmental sustainability. Also, Norway needs a solution to food insecurity that does not involve having more women work since so many of them are already working.

In Norway, migrant workers are important to food production. Migrant workers will take manual labor jobs that Norwegians don't want to take. When the Covid-19 pandemic started, migrants were not able to come into the country and food production dropped. (Meland, 2020) Migrant workers in Norway primarily come from Poland, Lithuania and Ukraine. (Ødegård, 2020)

Norway is only able to use 2.7% of their land for agriculture. (The World Factbook, 2024) In the northern part of Norway, as well as the high-altitude areas of Norway, they can only farm for 2-3 months in the summer because of the cold temperatures and the limited amount of sunlight. Because of these issues, Norway is unable to grow certain foods, but they can grow some crops such as potatoes, carrots, barley, apples and some berries. (Marin, 2024) To solve its reliance on food imports, Norway needs to find ways to increase their yield on the crops that they grow on the limited land that can be used for agriculture.

Norway has become too dependent on food imports to feed the people of its country. Norway is only about 40% self-sufficient in their food production. (Kristiansen, 2023) This means Norway would only be able to feed 40% of their population and 60% of their population would experience food insecurity if food imports were to stop. While Norway is very dependent overall on food imports, they are not dependent on food imports for animal products such as meat and dairy from cows and sheep. Norway is most dependent on importing grains. (Ramos, 2024)

The reason Norway has become so dependent on imports of grains is because of the small amount of land that is able to be used to farm and the cold climate and limited amount of sunlight due to being so far north. Norway is not alone in their reliance on imports to feed its people. There are many other countries in the world that are not self-sufficient in feeding their people. (Lloyd, 2024) If Norway can find ways to reduce their reliance on imports to feed its people, they could possibly use that as a model to help other countries reduce their dependence on importing food.

While Norway is not experiencing food insecurity now, their high reliance on imports is risky. For example, during World War I, Norway was unable to import grains, and they almost experienced a famine. When World War I ended, Norway was able to import grains again. Norway learned from this, and they made grain storage and stockpiled grain. However, Norway has shut the grain storage down in 2003. (Kristiansen, 2023) With all of the uncertainties in world right now, countries such as Norway who rely on food imports may not be able to continue to rely on imports to feed their population. The war in Ukraine is a cause for uncertainty in the world and could affect food imports for Norway. Also, with the United States showing interest in Greenland due to it being in the arctic, this could affect Norway due to it being in the arctic as well.

Norway needs to become more food independent in order to increase its food security. Since Norway is most reliant on importing grains, a solution to fix the problem should focus on helping to get Norwegian farmers to be able to grow more grains. One way that Norway can reduce its dependence on importing grains would be to utilize fish trimmings and fish waste as fertilizer for their fields to increase crop production on the limited land that is available for farming. The resources to implement this solution are ones that Norway already has. Norway needs to see the potential risk with their reliance on imports. The people of Norway need to willing make changes to fix this major issue Norway is facing.

Norway can use fish waste, which they already have due to their fish farming, to produce fertilizer. They would not need to spend a lot more money on fertilizer for their farmland to increase food production. The best part of this solution is that they do not need any outside help. Norway is the second biggest exporter of fish. They can collect the parts of the fish that they would otherwise throw away, which include the trimmings tissues like the heads, guts and tails. (Ahuja, 2020) The trimmings would then have to be either composted or fermented in order to get fertilizer rich in nitrogen, phosphorus and other nutrients. This fertilizer improves crop quality and helps to produce crops with better yields by making the crops more disease and pest resistant and having stronger roots. (Green Adjuvants, 2022) Norway could also use the fish poop as fertilizer along with the fish trimmings. Norway fish farms can collect and process the fish waste, also known as sludge from the fish farms. Norway farmers can use the sludge as a nitrogen rich fertilizer for their farm fields to increase food production. (Waycott, 2021) The process of collecting the fish sludge begins by using specialized nets that collect the sludge that falls to the bottom of the nets instead of sinking straight through the net. The sludge is then filtered and taken away to produce fertilizer from it. (Ahuja et al., 2020) Also, an extra benefit of this is that by collecting and using the sludge, the fish farms are able to increase their fish production. Fish waste will be reduced, which reduces environmental concerns and allows the fish farms to be allowed a higher number of fish that they are allowed to produce. This extra fish production could also be used to help feed the people of Norway and also could be exported to help reduce food insecurity in other countries.

In addition to Norway being dependent on imports for grains, Norway is also dependent on imports for phosphorous used in farming. Norway gets a lot of their phosphorous from Russia. (Ragn-Sells Group, 2023) With the Ukrainian War, there is a lot of uncertainty with Russia for Norway. Having a renewable source of phosphorous from the fish waste would be very good for Norway. If the price of fertilizer goes up, food costs would go up as well.

The fish industry in Norway would have to be very involved in implementing this solution, since they would play such a major role in the solution. The fish farmers would have to change some of their processes. They would have to find a way to collect the parts of the fish that they would otherwise have thrown away and they would need to find ways to collect and process the sludge. The government could incentivize the fish farms to collect fish waste and sludge by giving tax breaks or by increasing the amount of fish they are allowed to raise. The fishing industry could process the fish waste into fertilizer with help from the Norwegian fertilizer companies. The current Norwegian fertilizer companies already have a good transportation network that could be utilized to distribute this new fertilizer. To help with implementation the government could provide tax breaks and incentives to the fertilizer companies to get them involved. To fully implement this plan there would need to be a partnership between the fish industry, the fertilizer industry, and the government.

Currently, the Norwegian government bans the use of phosphorus in food for animals, if it was once classified as waste. (Ragn-Sells Group, 2023) In order to help implement the solution of using fish waste as fertilizer for crops, it would be helpful if the Norwegian government removed that ban. Fish farmers would be more likely to implement the plan of collecting and using fish waste if there were multiple uses for the fish waste.

Norway is a very progressive country, and their people care about the environment. (EatLiveEscape, 2023) The solution to use fish and fish waste as fertilizer for crops fits very well with Norway's social views. This solution helps with environmental sustainability which is in line with Norway's social views. Also, because Norwegians care a lot about social justice, making sure that every one of their citizens have enough to eat is important to them. Because Norway has a relatively small population and so many of Norway's population live in urban areas, a solution to the food import problem needs to be a solution that does not need a lot of extra people to make it happen. Because Norway already has a very good fish industry, the solution of using fish and fish waste for fertilizer would not take a lot of extra people compared to other solutions.

Norway has become too dependent on food imports, especially importing grains, to feed the people of its country. With global uncertainty, relying on imports of food is not a good idea. In order to help Norway become less reliant on imports, they should utilize excess fish and fish waste as fertilizer for their fields to increase crop production on the limited land that they have available for farming. Norway has such a great fish industry and because of their social progressiveness, they are in a good position to try this solution. If this idea works in Norway, this could be used as a model in other countries in order to grow more food in a sustainable manner which would allow for the reduction of the reliance on food imports and reduce food insecurity.

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