Sustaining Arctic Communities
Enhancing Food Security for Indigenous Peoples in the EU's Arctic Regions

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The European Union (EU) is a significant contributor to global warming in the Arctic (*Press Corner*, 2021). This results in the decrease in snow and ice surfaces and increased air pollution. While mentioning the Arctic usually steers peoples mind towards a cold remote place somewhere close to the North Pole, the Arctic is much closer than we think. Around 0,16% of the population of the European Union, is inhabitant of the European Arctic regions (*Finland*, n.d.; *Facts and Figures, EU Demographics | European Union*, n.d.; *Sweden*, n.d.). This 0,16% accounts to roughly 700.000 EU citizens who live in the northern-most parts of Sweden and Finland. This number is excluding the Arctic regions of Denmark, because they only include Greenland and the Faroe Islands, neither of which is part of the EU (*The Kingdom of Denmark*, n.d.).

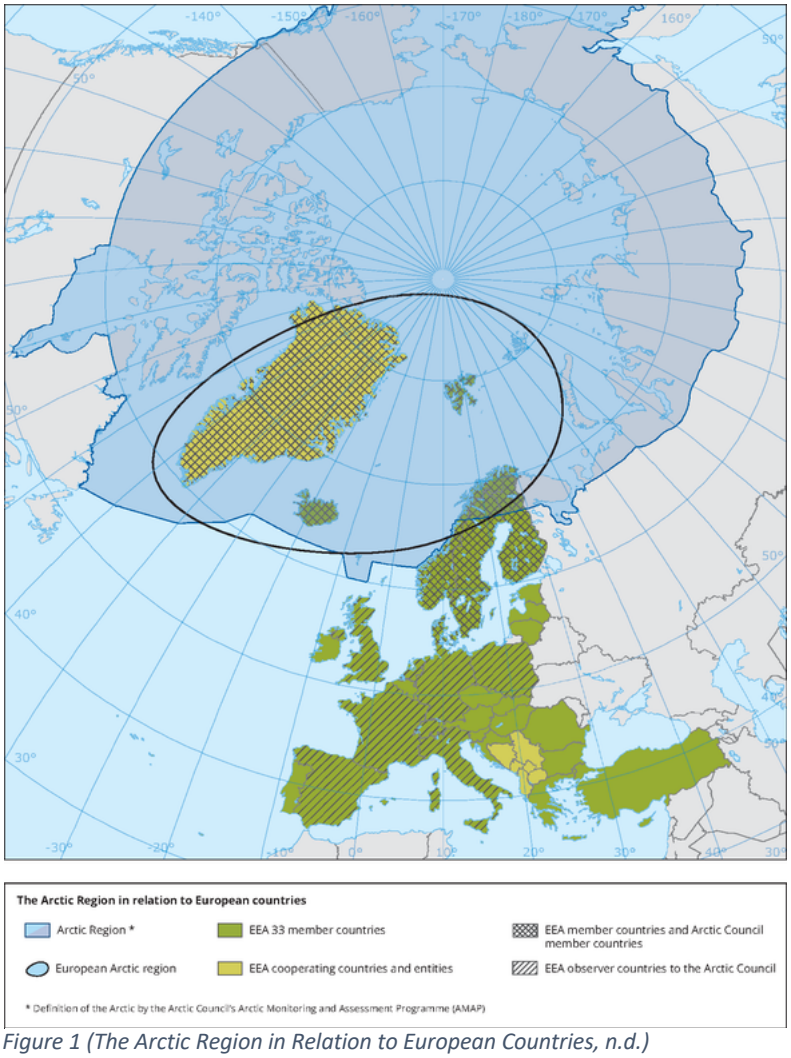

Figure 1 (The Arctic Region in Relation to European Countries, n.d.)

The problem of the Sami

While all these people live in remote areas, only a small portion of these 700.000 inhabitants consist of indigenous peoples. It is estimated (in the absence of an official census) that around 28.000 Sami inhabit Sweden and Finland (Swedish Institute, 2023). Because the changing climate has grave effects on the Arctic region, this also means the livelihood of its inhabitants is impacted. One of the problems that encapsulates all different areas of concern is the issue of food security (Nilsson et al., 2013, p. 116). Food security in the Arctic region is the combinations of different environmental, social, economic, political, and cultural changes. The issue of food security is however not a new phenomenon. Food security is included in The Universal Declaration of Human

Rights in Article 25: "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food…*".* (OHCHR, n.d.). And even though this declaration dates to 1948, the issue is as pressing as ever. This is illustrated by the growing number of initiatives – both national and international – who deal with this topic. Just last year a resolution addressing the issue of food security was adapted by the United Nations General Assembly (UNGA) (*General Assembly Adopts Resolution Addressing Global Food Crisis | UN Press*, 2022). This resolution particularly addressed Member States and relevant stakeholders to keep food and agriculture supply chains functioning.

Defining food security

In this paper, we define food security as part of human security, as established by the United Nations. The definition given by the Food and Agriculture Organization of the United Nations (FAO) is: "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, ESA, 2006, p. 1). From this definition, we can identify the four pillars of food security as availability of food, access to food, utilization of food and stability of food.

As part of the European Green Deal, the EU has devoted itself to promote healthy and sustainable living (Agriculture and the Green Deal, n.d.). Among these goals is also the promise to ensure that all EU citizens enjoys the promise of food security in the face of climate change and loss of biodiversity.

As mentioned before, most of the inhabitants of the EU Arctic are non-indigenous peoples. However, the topic of food security is especially relevant for that relatively small group of indigenous people. Indigenous food systems have always been characterized by self-sufficiency, without relying on the common markets (FAO, 2021). It is therefore especially important to secure the four different pillars of food security. To allow us to make any meaningful recommendations on food security for the Sami people in the Arctic, we first need to establish which of these pillars of food security are threatened by climate change. This problem assessment is made more difficult by the fact that there is a lack of separate data on Sami people, making it complicated to monitor their human rights (Vars, 2021).

Food insecurity

In general, the prevalence of severe food insecurity in Sweden increased between 2014-2016 and 2019-2021 from 0.8% to 1.3%, while the prevalence of moderate and severe food insecurity increased from 4.5% to 5.3% (*FAOSTAT*, n.d.-a). For Finland, the same results indicated a stable percentage of 2.4% of severe food insecurity from and a decrease in moderate and severe food insecurity from 9.3% to 8.8% (*FAOSTAT*, n.d.-b). Interestingly enough, Finland's results indicate a decrease in moderate and severe food insecurity for males, while food insecurity for females increased.

Availability of food and stability of food

From these four pillars, the main problem lies in the availability of (nutritious) food, and the stability of food. According to research into the effects of climate change on the Arctic food systems, a whole host of factors is at play (Nilsson et al., 2013, pp. 114-115). Most of the indigenous' food is locally sourced from the ecosystem. Therefore, changes in this ecosystem directly impact the availability of food for them. Traditionally, the Sami diet consists mainly of fruits, plants, and fish (Nilsson, 2018, p. 180). But in recent years the consumption of reindeer meat had predominated the fish consumption. This transition can be seen as problematic on two fronts. First, because the traditional Sami diet has been associated with many health benefits, while the consumption of large quantities of red meats is associated with negative health effects (Nilsson, 2018, 184-188).

The second problem with the predominance of reindeer meat consumption are the effects of climate change on reindeer herding (Nilsson, 2018, p. 191). In general, the reindeer population is threatened by climate change. Because the Sami of today are not self-sufficient, increased effects of climate change could be detrimental to the Sami's access to nutritious foods that sustain a healthy life.

To shift this deterioration of their healthy diet back to a more traditional and well-rounded diet, a creative solution is needed. To bring about this shift, the Sami diet should return to their more traditional diet of mainly fruits, plants, and fish. A current issue with the availability of fish is the environmental contamination of the waters used for fishing (Nilsson, 2018, p. 187). This means that consuming large quantities of fish poses negative health implications as well.

Sustainable and innovating farming

To improve the access to a healthy and nutritious diet for the Sami people and to establish this access year-round, I propose the development of a sustainable food system. I believe that to develop a sustainable food system, it is necessary to look at new and innovative solutions. The solution I propose is the development of an Aquaponics infrastructure (Tyson et al., 2011).

Aquaponics is a circular method that is employed to grow produce and breed fish in a sustainable manner. This method combines a hydroponic production system with recirculating aquaculture (Tyson et al., 2011). Figure 2 illustrates how the process starts with water that has been contaminated by fish food and waste. After this, the chemical process allows the wastewater from the fish to be used to grow crops. This results in two usable crops: plants and fish.

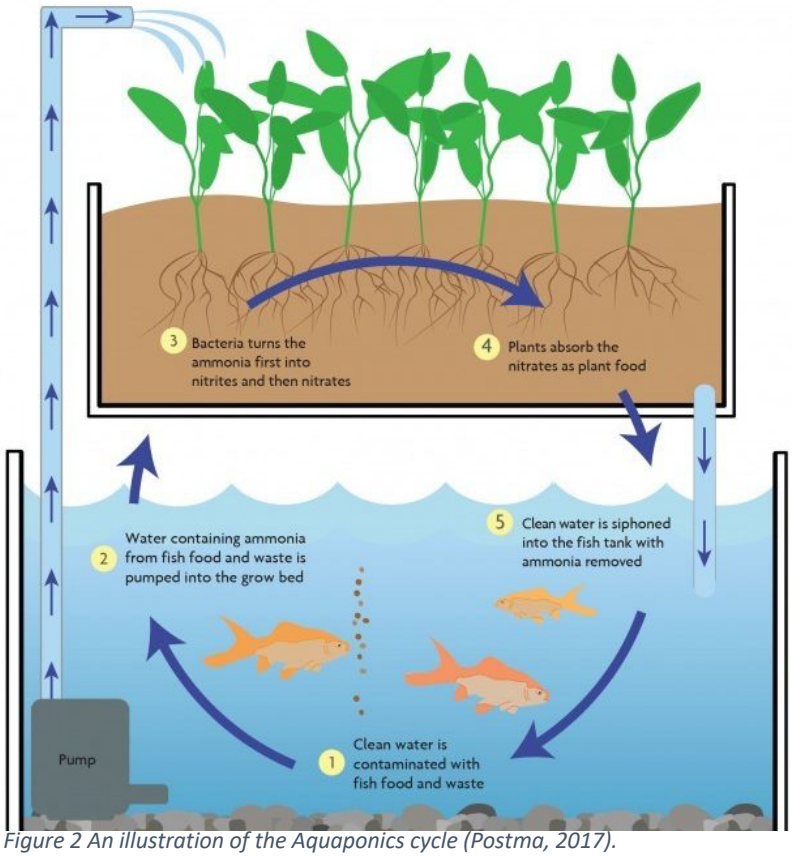

Figure 2 An illustration of the Aquaponics cycle (Postma, 2017).

The shared cost of implementing an innovative approach resulting in two crops is just one of the benefits (Tyson et al., 2011). In addition, the aquaponic method allows for a significant reduction in water usage and in waste discharge to the environment. This method is most suitable for people who understand both processes of growing crops and breeding fish. Moreover, because the method reduces the waste of water usage, the Sami people can implement this method without needing a large water supply.

While the Aquaponics method is used worldwide in different climates, the method is also suited to be implemented in colder climates. In 2017, a Canadian corporation invested money and received permits to start building an aquaponics farm in the Canadian Arctic region of Yukon (Government of Canada; Canadian Northern Economic Development Agency, 2018). This project could pose as a good example of implementing aquaponics in the EU Arctic regions because of the similarities between the climates but also the indigenous population.

The two biggest disadvantages of aquaponics are initial cost of setup and ensuring there is sufficient expertise and the high energy expenditure of the system. While there is no way around the setup costs, the long-term benefits for food availability and health benefits for the Sami should far outweigh these costs. As for the high energy demand of the aquaponic system, large amounts of energy generation happen on Sami lands (Stockholm Environment Institute, 2020). As of 2020, 36% of Sweden's total electricity generation came from hydropower plants on Sami lands. Because the building of these plants happened in the first half of the 20th century, the Sami had no voice in protecting their lands against this. As these hydropower generations are already located on their lands, the energy demand of aquaponics should not form a large problem.

Considering the evident advantages of implementing aquaponics, the production of high-quality and year-round produce and fish against a reduced water consumption far outweigh the disadvantages. And although it only allows for a limited choice of crops, it does form an eco-friendly way to provide access to nutritious foods that sustain a healthy life for the Sami people. By implementing an innovative farming method like aquaponics in the EU Arctic regions, the EU can take a promising step towards achieving their goals of ensuring food security and creating healthy and sustainable communities in the Arctic.

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