

Article

The Social Metabolism of Quiet Sustainability in the Faroe Islands

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Abstract: This paper investigates the interrelations between social metabolism and socio-ecological sustainability in the Faroe Islands in a long-term perspective. It traces the trajectory and changes in socio-metabolic configurations from the time of settlement until today and shows how social metabolism has increased to very high per capita levels during the past century. The analysis departs from the recognition that a decrease in social metabolism, i.e., a net reduction in throughput of natural resources in human economies, is necessary in order to curb the impending ecological crisis. It is argued that parallel to the growth oriented formal Faroese economy, economic food-provisioning practices rooted in the traditional, and ecologically sustainable, land management system continue to be practiced by Faroese people. These practices can be conceptualized as practices of so-called “quiet sustainability” and their contribution is estimated in bio-physical metrics of weight. The analysis shows that practices of “quiet sustainability” contribute significant quantities of certain food items to the local population thereby enhancing food security and food sovereignty. Moreover, these practices are an integral element in the biocultural diversity, which has constituted the Faroe Islands for close to two millennia. Therefore, they should be considered real alternatives to import-based consumption and taken into account in sustainability discourse and policy to a higher degree than is currently the case.

Keywords: social metabolism; island metabolism; quiet sustainability; Faroe Islands; landesque capital; historical political ecology

1. Introduction

On a global scale, and in a long-term perspective, current levels of resource use in human economies are not sustainable. As natural capital is spent at a faster pace than it is replenished, the capabilities of the earth system to provide vital ecosystem service are undermined, and critical planetary boundaries for a safe human operating space are transgressed [1–4]. The scale of global environmental change is unprecedented in human history [5] and the consequences on the climate and other crucial ecosystem functions have long been reported. More recently, this research is synthesized by the IPCC (Intergovernmental Panel on Climate Change) and the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services). Achieving a high quality of life for more than seven billion people without destabilizing planetary processes and undermining fundamental ecosystem services remains a formidable challenge, and it requires a reduction in absolute resource use and thereby a reduction in social metabolism [6].

Islands are “good to think with” [7], and the paper addresses the above mentioned challenge thinking with the case of the Faroe Islands, or the Faroes, a small island nation in the North Atlantic. As boundaries are more easily discernible on islands, they offer great potential in the study of crucial issues pertaining to sustainability such as biocultural diversity, and the social organization of material and energy flows [8–11].

This particular case study offers an opportunity to think about sustainability and human well-being by looking at social metabolism in the Faroes in a long-term perspective. It traces the emergence of an ecologically sustainable land management system from the time of settlement around 300 AD and identifies economic practices carried out by Faroese people today rooted in this system. It also briefly traces the emergence and development of industrial metabolism during the twentieth century. As has been shown to be the case for other island societies [12], the Faroes experienced substantial transformations after the 1950s, which entailed increased resource dependence beyond the islands' geographical borders. The Faroese trajectory can be compared with the metabolic profiles of other small island states such as Iceland and Trinidad and Tobago, which have been described by Krausmann et al. [11] as examples of high-income island economies with very specific resource use patterns. In the case of the Faroes, an export-oriented fishing industry (and in later decades also aquaculture) is driving very high, and increasing, levels of material and energy use per capita [13]. The geographical isolation combined with a metabolic profile of high-level resource extraction, and high dependence on imports, makes island societies vulnerable to economic and ecological flux. One extreme case to illustrate this point is Nauru, where phosphate mining devastated local ecosystems to a very large degree and where the social and cultural consequences of such devastation are evident [14]. To counter this development of increasing dependency, many island societies have consciously sought to reconnect their island economies to their natural systems, but such recoupling presents several challenges related to questions of resilience, vulnerability, and sustainability [12].

Social Metabolism, Biocultural Diversity, and Diverse Practices of Quiet Sustainability

Reversing the trend of growing social metabolism without compromising human well-being is arguably the key challenge for sustainability science. While much focus remains on technological solutions, the cultural dimensions of sustainability are often neglected, together with the realization that the process of increasing social metabolism is also a process of increasing biodiversity and cultural loss. In other words, increasing social metabolism is very often a process of decontextualization [15] and of biocultural homogenization [16,17] often entailing environmental and social injustices and tradeoffs [18]. As Rozzi [16] has argued, in the context of global socio-environmental change, the world views, knowledge, and practices of sustainable cultures should be respected and eventually adapted through intercultural exchange. This article explores how practices rooted not in other cultures, but in an ecologically sustainable cultural past may be adapted, or reevaluated and enhanced in a modern, high-resource use context. In a recent review of Pacific small island knowledge-practice-belief systems, McMillen et al. [19] argue that such systems include valuable insights on ecological processes and management of biocultural diversity relevant for resilience and adaptability, particularly regarding the effects of climate change. The argument put forward here is that such knowledge systems are not only crucial for adaptability to climate change, but also in mitigation. The recognition of the importance of traditional and indigenous knowledge in land and resource management is not new [20] and is visible, for instance, in article eight in the Convention of Biological Diversity and the accompanying Akwé: Kon guidelines, but in most policy context it remains at the margin of mainstream development discourse. However, as the consequences of mainstream "development" become evident, the importance of nurturing and conserving local and culturally specific economic practices and habits is increasingly recognized.

In the following analysis, economic practices in the Faroes, rooted in the traditional land management system, are identified as practices of "quiet sustainability." Smith and Jehlicka [21] have defined quiet sustainability as long-standing forms of food self-provisioning, i.e., the growing and sharing of food as common practices carrying environmental and social benefits, yet it receives little consideration in academic literature and policy discourse on sustainability. Practices of quiet sustainability are everyday practices with low environmental impacts. Such practices, in the Faroese context, can also be conceptualized as a form of diverse or alternative economic practice, as defined by Gibson-Graham [22]. From a physical perspective they are rooted in a traditional socio-economic

system where nutrients and biomass were recycled, and which was primarily oriented towards local consumption and self-provisioning. From an ideological perspective, they are rooted in land management traditions, which were governed by a so-called limited-good world view [23]. These characteristics distinguish them from the economic practices and moral principles characterizing and organizing the growth oriented industrial metabolism of the Faroes.

In order to illuminate the distinctions between industrial social metabolism and the social metabolism of quiet sustainability, the analysis draws on theoretical discussions on socio-metabolic constellations/configurations, and the implications for long-term sustainability. Additionally, the analysis draws on theoretical insights from long-term socio-ecological research, environmental history, and historical political ecology, such as the concept of landesque capital [24–31], in order to investigate how different socio-metabolic configurations produce distinct forms of capital stocks, and the role of these capital stocks in resource flow path dependencies [32–34]. One key insight gained from this body of research and literature is that humans can organize society and social metabolism in ways that contribute to both sustainability and equality. Accepting this proposition avoids the analytical confinement to the idea that there is a fundamental contradiction between human society and the natural environment [35]. Humans, however, can also organize social metabolism in ways that undermine the very ecological and social foundation of their (or others') society. Endeavors to establish and maintain balanced relations between environmental sustainability and social and economic equality are a central question in (historical) political ecology [36], and the urgency of this question is becoming ever more apparent as both social metabolism and economic inequality are increasing [37,38]. Such endeavors towards ecological sustainability and economic equity may arguably be seen as processes of “islanding” [39]: of perceiving, discerning, and negotiating the boundaries that define human–human and human–nature interrelations. One way of doing this, in practice, is to organize economies into separate spheres of exchange. The principle of separate spheres of exchange has been identified ethnographically in many cultures, and it has been suggested as a way to “insulate local sustainability and resilience from the deleterious effects of globalization and financial speculation” [40]. Departing from this point, the aim here is to identify and delineate distinct spheres or modes of social metabolism co-occurring on the Faroes. The implication is a deliberate emphasis on the fact that distinct modes of social metabolism do not only belong to certain historical time periods defined as metabolic regimes [41,42], but that such modes co-occur, and that people, in their daily practices, switch between socio-metabolic modalities [43,44]. The fact that they are coeval is of relevance for sustainability science because it demonstrates that alternatives to unsustainable resource use patterns and strategies are already (quietly) present in society.

One of the traits defining practices of quiet sustainability is that they contribute to sustainability but without explicitly seeking to do so. These practices are thus already contributing to sustainability but are not counted as such. The main contribution of this article is to count some of these practices, and thereby make them count. In other words, to quantify the contribution of the people practicing “quiet sustainability” in the Faroes to highlight the relevance of these activities as already existing and potential forces of sustainability, and their importance to food security and food sovereignty in an island context.

2. Materials and Methods

The Faroe Islands are an island nation in the North Atlantic Ocean comprising 18 islands, 17 of which are inhabited. The population is approximately 51,000, and the land area is 1399 square kilometers. Ocean territory or EEZ (exclusive economic zone) is almost 274,000 square kilometers. The Faroes were probably first settled around 300 AD and became part of the Norwegian Kingdom in the 13th century. Together with Greenland and Iceland, the Faroes were under the Norwegian and later the Danish crown but gained Home Rule in 1948 and are a self-governing nation with extensive autonomous powers and responsibilities within the kingdom of Denmark. The Faroes are often popularly described as a welfare society of the so-called Nordic model, and GDP per capita ranks

among the highest in the world [45]. Fish has been the main export item for the past century, and fish products make out 90–95% of the export value.

As the primary ambition with this paper is an investigation of social metabolism in the Faroe Islands, it draws on methods and methodology in the field of social metabolism [46,47]. While the official statistics agency of the Faroes produces much relevant statistical material, physical statistics are not prioritized, and this makes more established methods of material and energy flows, such as MEFA and MFA, less feasible. Regarding informal economic practices that would fall under the definition of “quiet sustainability,” even those that contribute significant volumes of food, these are often classified as “hobbies” within Faroese administration [48], and statistics are not available.

The methods used in this analysis have therefore been adapted to the specific context of the field and the aim of the study. To provide a metabolic profile and a schematic assessment of Faroese industrial metabolism, relevant statistical material has been collected from peer-reviewed literature and publicly available statistical records. The method used to make quantitative estimates of quiet sustainability practices has been to conduct searches in peer-reviewed literature, gray literature, and statistical records. In some cases, official statistics are available, for instance statistical records on the Faroese pilot whale catch go back to the year 1584 and are therefore among the best documented hunting practices in the world. For other alternative and traditionally rooted economic practices, information is more obscure and most of the data has been found in gray literature, mostly from government and agency reports. Data on fowling has been obtained through personal communication with experts in the field. The practices included in the analysis are therefore those where data were found to base estimates on. These practices were sheep rearing, potato cultivation, fowling, and whaling. This selection and methodological approach means that many other practices are excluded, such as the raising of geese, ducks, and chicken, other forms of hunting and gathering, and more.

The methodology also implies a gendered approach to the economy, emphasizing the male sphere and excluding food items that are mostly produced by women, such as various kinds of sausages made from the parts of sheep that are not meat. Likewise, limiting practices of quiet sustainability to food provisioning practices means excluding other traditional and essential provisioning strategies such as the production of yarn and clothes through the practices of spinning, weaving, and particularly knitting, which many Faroese women continue to engage in on a daily basis.

3. Results

3.1. Industrial and Traditional Social Metabolism on the Faroes

Prior to around 1950, Faroese society was sustained to a large degree by material and energy flows originating within its geographical borders. After 1950, as the Faroes have been increasingly incorporated into the wider and emerging extractive global economy and global food system, the size of material and energy flows crossing its geographical borders has increased dramatically. The Faroese economy is a very clear example of how inclusion into the global market and the development of an export-oriented industry, in this case fisheries, has led to growing per capita levels of material and energy use. During the 20th century total catch figures grew from an estimated 1200 tons in 1903 to more than 700,000 tons in 2017 [49] (Figure 1). Per capita, fish catches went from 80 kg in 1903 to almost 14 tons in 2017, corresponding to a 175-fold increase. A large proportion of this catch is exported, more than 500,000 tons in 2017, corresponding to more than 10 tons per capita. In the quarter century between 1993 and 2017 total physical exports grew from 176,000 tons in 1993 to 589,093 tons in 2017 [50]. Physical export in 2017 corresponds to more than 11 tons per capita. In comparison, physical export in the EU is approximately 1 ton per capita [51].

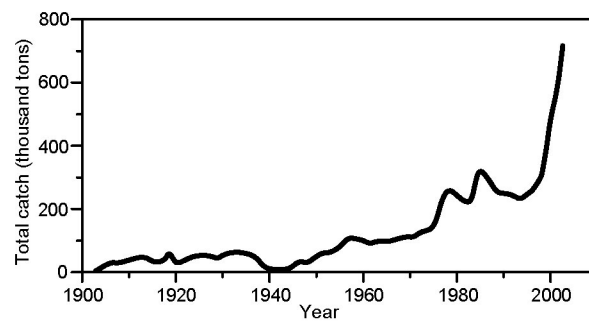


Figure 1. Total Faroese fisheries catch in the century between 1903 and 2003. Adapted from Jákupstovu [49].

The revenues from these high levels of export enable a high material standard of living in the Faroes, but as has been the case for many other island societies, it has also created dependence on imports to sustain basic human needs and modern economic functions [12]. Revenues likewise enable large investments and build-up of industrial infrastructure. Much of this infrastructure requires high levels of resource and energy use to be sustained and to maintain productivity, and the fossil fuel requirements of Faroese industrial fisheries are very high. Generally speaking, the energy efficiency performance of industrial fisheries has worsened over time [52], and as fish stocks are becoming overexploited, greater effort and energy inputs are required. In 2018, the fishing fleet contributed 44% of total Faroese CO₂ emissions from the burning of fossil fuels. Another 6% of emissions can also be attributed to the fishing fleet through the use of greenhouse gases in cooling systems and other industrial processes. Emissions from fisheries have increased from approximately 200,000 tons in 1990 to more than 500,000 tons in 2018 [53]. Export revenues similarly enable imports of all kinds of artefacts and consumer goods. Statistics on physical imports are not available, but statistical information on CO₂ emissions and waste production may be seen as indicators of a high import level, since most consumption goods and all fossil energy are imported. A portion of these goods accumulates in capital stocks (people, livestock, and infrastructure), and the rest dissipates into various kinds of pollution and waste. CO₂ emissions were as high as approximately 20 tons per capita in 2017 [54], and waste production in the same year was more than 1 ton per capita [55]. In comparison, the production of municipal waste in Europe was 486 kg per capita in 2017 [56] (See Figure 2 and Table 1).

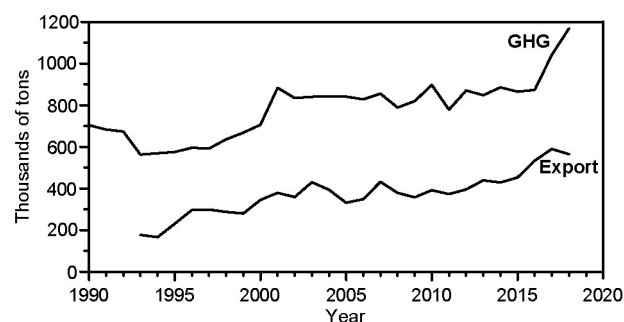


Figure 2. Growth in greenhouse gas (GHG) emission in CO₂ equivalents and total physical exports since the early 1990s. Source: Statistics Faroe Islands and the Faroese Environment Agency.

The dramatic increase in CO₂ emissions and in fish biomass extracted from the sea (illustrated in Figures 1 and 2) attest to the increasing flows of exhaustible resources required to sustain these industrial processes and the resulting net increase in social metabolism.

Table 1. Socio-metabolic characteristics of the Faroe Islands for European and global comparison for the year 2017.

Indicator	Faroe Isl.	EU	World
Population density (people/km ²)	36	118	51
CO ₂ emission per capita (tons CO ₂ /year)	20	7	5
Waste generation per capita (kg/day)	2.9	1.3	1.1

Sources: Environment Agency of the Faroe Islands, Eurostat, and the World Bank.

The argument pursued in this paper is that the informal or diverse economy, carried out by people engaging in practices of “quiet sustainability,” should not be ignored or neglected as part of the solution to the sustainability challenges of reducing greenhouse gas emissions, and more generally, of reducing net social metabolism, as well as of conserving and enhancing biodiversity. Dominant discourses on economy and sustainability in the Faroes are governed by an ideology of growth, an ideology that is in turn materializing in growing social metabolism. However, alongside or parallel to this “real” industrial economy is the alternative or diverse economy, which is arguably governed by different logics and moral principles. The practices associated with the alternative economy are not necessarily framed as sustainable, often quite the contrary, they are considered backward and unnecessary. Informal and non-commercial food provisioning practices are not seen as alternatives to industrially based production and consumption, and they are mostly either ignored or neglected in policy and physical planning. Many of these practices of quiet sustainability in the Faroes are rooted in the traditional land management system.

The system and cultural principles organizing traditional Faroese society and social metabolism is often referred to as the infield/outfield system. The cultivated infields surrounding the villages were cleared and marked from the outfields with stonewalls and were used to produce hay for winter fodder for the cows. It has been estimated that around 85–90% of the infield was used for making hay [57]. The remaining plots were cultivated with barley and swedes. Manure was collected and used in the barley plots that were worked using the practice of *reinaelting* (Faroese words in this text are in italics). This form of tilling, using only hand power, improved the productivity of the land and increased grass yields in the following years. The practice of *reinaelting*, first mentioned in historical sources from the 17th century, seems to have been a method exceptionally well adapted to the Faroese geography and climate to grow barley under very limiting climatic circumstances, to avoid soil erosion, and for improving the quality of the soil [58].

The outfields were used for grazing. Sheep grazed all year round, and the cattle grazed from around May or June until October and were kept in the byre during winter. Based on the information in farmers journals and other historical material, Guttesen [57,59–62] has suggested that dairy production constituted more than 40% of caloric intake. Imported grain made up close to 25%, and locally grown grain made up 8%. Although sheep rearing and sheep products had high cultural prestige, it contributed less than 20% to the diet, and fish was only 8%. These staple food items were supplemented with whale, seal, and seabird. The percentages presented above should of course be taken with caution, and there will have been significant variety during different time periods and in different geographic locations in the islands, but it underlines the importance of dairy production for food security in traditional Faroese society. Trade with the outside world was, however, always an element of the Faroese economy. In return for fish and/or wool products, the Faroese imported grain, which was a staple in the Faroese diet, timber, which was always in shortage on the treeless islands, soapstone, and a number of luxury goods [63].

In many respects, Faroese society, from settlement and up until around 1800 can be seen as an example of a steady state economy. After settlement, the population is believed to have steadily increased up until around 3000–4000 people and to have remained stable for the next five centuries. The land, and what it produced, was divided and organized in units of value, which ultimately measured the material stocks and flows comprising Faroese society in *mørk*, *gyllin* and *skinn*. *Mørk*,

gyllin and *skinn* were traditional measures of land area, weight, and value, and they continue to govern traditionally rooted food provisioning practices. One *mørk* is 16 *gyllin*, and one *gyllin* is 20 *skinn*. One *skinn* was the value of a sheepskin, and one *mørk* of land could sustain between 40 and 48 sheep. Half a *mørk* was the minimum requirement to sustain a family. As all land and resources were measured according to this system, the total number of *mørk* was the calculated and culturally negotiated carrying capacity of traditional Faroese society [64].

3.2. The Sustainable Roots of Current Faroese Land Use Management Practices

From a long-term socio-ecological perspective, it makes sense to divide Faroese history into three periods. The first period runs from the initial settlement of the islands around 300 AD and up until around 1300 AD, when the so-called Sheep Letter *Seyðabrævið*, a royal decree dating to 1298 AD, codified land management practices that came to dominate and regulate Faroese society during the following centuries and largely into the modern period. The third period is the period of modernization setting off around 1800 and during which Faroese society and economy underwent fundamental changes, going from an agrarian regime to an industrial regime.

It is uncertain when the Faroes were first settled and by whom, but archaeological evidence dates settlement back to around 300 AD. During the 8th and 9th centuries, historical records document the arrival of Norse migrants who brought with them their agricultural and cultural traditions. The first settlement period indicates a larger reliance on the hunting of seals, whales, seabirds, while the grazing lands were used as a common-pool resource to manage herds of sheep, cattle, and pigs [65,66]. Around 1300, there is evidence of a restructuring of land management and the establishment of the so-called infield/outfield system. Analyses of the historical ecology of the Faroes have shown that the Faroese adopted a distinct approach to economy and land management early on, investing in landesque capital that improved agricultural yields and largely avoided deterioration of grazing lands [67]. The infield/outfield model also governed sustainable catches of wild seabirds and fish, whale, and seal, thus creating a sustainable cultural landscape.

The Sheep Letter probably reinforced and formalized the control of resources by the landowner elite, allowing regulation of resource exploitation and enforcing certain restrictions on the access to common resources. These management practices were remarkably efficient in avoiding so-called “tragedies of the commons,” and the management system must be defined as a successful commons governance regime [68,69]. To acknowledge this achievement should not be understood as any kind of glorification of traditional Faroese society as these management practices entailed economic and social inequalities. Social power, hierarchy, and access to resources was intimately associated with land ownership. However, although the system manifested inherent social differences between people, there is evidence that people are likely to have had adequate access to food regardless of their social status [69]. Everyone also had the right to cut peat, which was the only fuel source in the Faroes [63]. Nevertheless, there were also periods of starvation. The reliance on a variety of food sources and production systems (herding, hunting, gathering and cultivation) made Faroese society relatively resilient, but when one or more of these sources failed, and it co-occurred with insufficient imports of grain, people starved. One such period was reported for the years 1808 and 1809 when the grain harvest was poor, fish catches were limited, and there were no pilot whale catches for a period of many years.

3.3. From an Agrarian to an Industrial Socio-Metabolic Regime

In 1801 the population had reached 5000 people and systematic efforts to change the traditional production system were pushed by the colonial authorities in order to intensify and increase production. The introduction of potato cultivation (which eventually replaced barley cultivation and the practice of *reinaveltning*), the appropriation of tracts of the outfields for cultivation, and the systematic attempts to establish an export-oriented fishing industry were colonial projects, which were met with considerable local protest and resistance [70,71]. With the changes occurring during the 19th century, with a

considerable portion of the outfields taken into cultivation, the traditional balance between the infield and the outfield was disrupted. The new cultivated plots were the so called *traðir* and the people who cultivated them emerged as a new social category of people, *traðarmenn* (men of the cultivated plot), formerly landless people, who were now able to feed themselves. This social category did not have access to the outfield grazing areas and other land-based resources, but fishing was open-access and everyone also had rights to whale meat. The cow was still the crucial element in food security, and one cow per family or one cow between two families, supplemented with fishing and potato cultivation, provided the required caloric base for poor families. The *traðir* may be seen as a form of urban gardening developing during the 19th century and as a source of resilience for long-term urban food security [72,73].

Although, as has already been stressed, this traditional land and resource management system is not considered part of the “real” formal economy, it continues to operate alongside the industrial system, and it continues to provide people with food and other services. Only two food provisioning practices in the Faroes have become fully industrialized and mechanized; fisheries and dairy production. The traditional form of fishing in the Faroes was *útróður*, which was carried out in wooden oar boats. Cod fishing, for instance, was typically carried out in wooden boats fitting eight rowers *áttamannafar*, and resources from the sea were common and open access [63]. Fisheries became the main industry in the Faroes during the 20th century, but the practice of *útróður*, that is, small-scale coastal fisheries, has continued, both as a commercial practice and as a household and community food provisioning practice. In a census of the Faroese population carried out in 2011, 28% of Faroese households were reported to have access to a boat [74]. There is little doubt that *útróður* and other non-commercial and informal modes of food provisioning and distribution contribute significantly to the Faroese diet, but making estimates is difficult, so it is not included in this analysis. However, with the commercialization and marketization of fisheries, direct access to fish has declined for some groups or sections of people in the Faroes. Paradoxically, although catch figures have increased dramatically during the past century, direct access to fish has been reduced.

While the industrial exploitation of the marine environment is largely oriented towards export, industrial agriculture is oriented towards supplying the local Faroese market. Dairy production is the only part of Faroese agriculture that has become fully commercialized and incorporated into the formal market economy. Dairy production in the Faroes was 148 L per capita in 2017 or 0.4 L per day per capita, corresponding well with daily recommended intake. The Faroes are therefore more or less self-sufficient in this respect, but production has become centralized with fewer and fewer producers and more mechanization, and increasingly dependent upon imported feed and fossil energy. From a biodiversity perspective, industrialization has entailed a replacement of endemic livestock breeds with imported breeds suited for industrial milk production. Endemic breeds were smaller and better adapted to the Faroese landscape [75], and contributed to the improvement of grazing pastures.

3.4. Quantifying Practices of Quiet Sustainability

The resource management practices and principles that have co-evolved from the human–nature interaction on the Faroes throughout the centuries have proven remarkably resilient. Allowing flexibility and building on intimate local knowledge, these community level management systems continue to benefit Faroese people today [69]. The practices, or habits, descending from this system are visible in the daily practices of quiet sustainability in the Faroes; the cultivation of potatoes and rhubarb in gardens or *traðir*, sheep rearing, fowling, and hunting. These are all practices that a large proportion of Faroese people engage in, some on a daily basis, others less frequently. More than 70% of the population have been reported to have “supplemented food source available” [74], indicating that a very large percentage of the population engage in self-provisioning food practices or at least benefit from them. It is outside the scope of this paper to estimate the total production of “quiet sustainability” practices in the Faroes. In the following, estimates are made for selected informal economic practices and results are summarized in Table 2.

Table 2. Estimated contribution of informal food provisioning practices. Figures refer to estimated average annual production during the past decades and do not refer to any specific year. Per capita calculations are based on a total population figure of 50,000 people.

Food Category	Total Amount ¹	Per Capita
Sheep	900 tons	18 kg
Potatoes	700 tons	14 kg
Sea bird	70 tons	1.4 kg
Whale meat	186 tons	3.6 kg
Whale blubber	167 tons	3.3 kg
Total	2023 tons	40.3 kg

¹ Sources to the figures are provided in the text.

3.4.1. Sheep Rearing

Sheep rearing in the Faroes is to a large extent still based on the principles codified in the Sheep Letter more than seven centuries ago. Sheep rearing is largely non-commercial and organized by community or kinship, and sheep meat is not exported but consumed locally. The most commonly quoted figures on sheep numbers in the Faroes is that there are 70,000 mother sheep, and that 50,000 sheep are slaughtered every year. There are historical sources indicating higher numbers of mother sheep in earlier periods. 18th and 19th century sources mention figures of 75,000, 96,000 and 100,000 mother sheep [48], but changes in the volume of production have not been dramatic. Traditionally, sheep were vulnerable to drastic climatic conditions, severe winters, or particularly devastating storms. While climatic conditions still affect the mortality rate of sheep in the outfield, other factors affecting mortality have been minimized. Use of medication and winter feeding has lowered mortality. The lowered mortality means that more sheep graze in the outfield, especially during the winter period, which in turn increases pressure on the grazing areas resulting in soil erosion and deteriorating quality of the pastures [76]. In summary, while production is perhaps the same or higher than in previous periods, it is increasingly dependent upon imported animal feed. In addition, as a result of the increasing pressure placed on the pastures, the bio-productive capacity of the land is eroded, undermining the potential for future sustainable pastoral food production. As has been shown in other cases of agricultural industrial intensification, the increase in production can entail negative sustainability consequences, both locally and in other territories [77]. The estimated yearly production of sheep meat is around 900 tons, corresponding roughly to around 18 kg per capita [78].

3.4.2. Cultivation (Potatoes)

Traditionally, the main crops cultivated in the Faroes were barley and swedes (brassica), but from the 19th century potatoes became the staple and more or less replaced other crops. It is difficult to assess how large formal and informal cultivation of potatoes is, but commercial potato production is limited. Many people keep their own potato fields in their gardens, for example, or in infield plots. A few farmers cultivate and sell potatoes, but locally produced potatoes cannot be produced at a lower cost than imported potatoes. It is estimated that around 700 tons of potatoes are cultivated every year, corresponding to around 20% of total potato consumption, while the rest is imported [78].

3.4.3. Fowling

Seabirds and seabird eggs were a significant supplement to the traditional Faroese diet, particularly on islands that had bird cliffs and were so-called birdplaces known as *fuglapláss* in Faroese. The species that were harvested were most commonly Atlantic puffin (*Fratercula arctica grabae*) and common guillemot (*Uria aalge*). However, numbers have declined drastically. It is believed that the numbers of guillemot on the island of Skúvoy were as many as two million in the 1950s. Today, it is estimated that only around 180,000 guillemot nest in all of the Faroe Islands. The reasons for the decline are debated, but local communities have, in some cases, significantly reduced or totally banned harvesting of some

seabird species. The most commonly harvested seabird today in the Faroes is the northern fulmar (*Fulmarus glacialis*). Fulmar eggs are harvested on the bird cliffs on some islands, and this harvest is regulated through the traditional land management system. As the young fulmars leave the bird cliffs in autumn for the first time and are not yet able to fly, they can be more or less picked out of the sea from a boat. Since the young fulmars are at sea, they have entered the commons and the catch is not regulated. No reliable statistics are available, but an estimate of total seabird catch in 2007 (including fulmar, puffin, guillemot, northern gannet, and more) was approximately 140,000 birds [79]. If every bird provided on average half a kg of food, the total contribution would be 70 tons or 1.4 kg per capita.

3.4.4. Whaling

Whale meat has most likely been consumed in the Faroes since the time of settlement, and community organized hunting of pilot whales has continued on the Faroes till this day. The fact that whale drives and distribution of whale catch is mentioned in the Sheep Letter indicates that the practice of pilot whale hunting or *grindadráp* goes back to at least the 14th century. Historical documentation and statistics of *grindadráp* catches go back to 1584, making it one of the best documented hunting practices in the world. The whale species hunted by the Faroese is the long-finned pilot whale (*Globicephala melas*). When a pod is spotted close enough to the coast, the whales are driven ashore and killed on the beaches. Pilot whales are not considered a threatened species by the IUCN (International Union for Conservation of Nature), but because of environmental and animal rights concerns, the practice of *grindadráp* has been highly controversial since the mid-1980s. In spite of this, the Faroese have so far continued the food provisioning practice of *grindadráp*. The size and distribution of a whale catch is measured in the traditional unit of *skinn*, and during the past two decades, the yearly average size of the whale catch has been approximately 4900 *skinn*. Using the *skinn* value of 38 kg for meat and 34 kg for blubber proposed by Bloch and Zahariassen [80], this can be calculated into an average annual contribution of 186 tons of whale meat and 167 tons of blubber.

4. Discussion

Even if the figures listed in Table 2 represent only a part of alternative local food provisioning practices, their contribution is significant. Adding together the sources of meat (sheep, pilot whale meat, and sea bird), the estimated annual amount of meat per person is 23 kg, corresponding to the world average annual meat consumption per person in 1961 [81]. Globally, meat consumption has surged, particularly in the more affluent regions of the world, and reached 43 kg per person in 2014. Current levels of meat consumption in the Faroes are very high, but returning to a local and more marine-based diet would bring both health and environmental benefits [82]. At the same time, local consumption of fish has probably declined and has to a large degree been replaced with imported meat. Considering the nutritional value of fish and the declining access to this local resource, it is mind provoking to reflect on that fact that if every Faroese inhabitant was provided with half a kilo of fish per day every day of the year, this amount would still only make out little more than 1% of what the total Faroese industrial fisheries catch. From a human health perspective as well as from a sustainability perspective, the consumption of locally caught fish should be encouraged. Here the framework of quiet sustainability can guide policy initiatives to re-evaluate and support traditional and alternative principles of resource distribution, such as informal and traditional food networks and forms of sharing, rather than continuing the process of increased marketization of local (marine) resources.

While the contribution of meat and fat is significant, the food items listed in Table 2 provide only a few percent of the necessary caloric requirements of the Faroese population, to say nothing of modern dietary preferences for food items exotic to the Faroes such as fruits and vegetables. The results in Table 2 also show that although potato production is relatively large (around 20% of total consumption), the Faroese agricultural landscape is almost exclusively used for meat and dairy production and very little space is dedicated to cultivation of food crops for direct human consumption. This pattern reflects the traditional land use described in the previous sections, where imported grain was an

integral element in the traditional Faroese economy and diet, supplemented with local grain and brassica production. While local meat and dairy production has remained relatively stable into modern times, cultivation of food crops for human consumption has probably decreased. Many people still keep a potato plot, but recently there have also been attempts, both commercial and non-commercial, to introduce new crops and cultivation practices and to reintroduce traditional practices in order to increase local production of vegetables and grains. New initiatives more in line with mainstream global sustainability discourses are also emerging. For instance, urban gardens of a more metropolitan appearance than the common potato and rhubarb gardens are popping up, and locally produced food is increasingly promoted as sustainable, healthy, and of a higher quality than imported food. Here, the Faroese case can be seen in comparison to another island study of dietary change and quiet sustainability practices. In their study on the Greek island of Samothraki, Petridis and Huber [83] (p. 263) propose to reinforce the sustainable elements of traditional practices by “associating them with values that find resonance within the community, such as health, localness, and quality.” In the Faroese case this strategy has been successful, at least to some extent. One particularly interesting example is the member group called *Veltan*, an initiative on the Faroese island of Sandoy, where a group of community members have organized themselves around the ambition to cultivate and grow vegetables, and also to preserve and build new knowledge. *Veltan* members produce food for their own household, and production is also commercial aiming to provide the Faroese market with local produce. Some of the recent initiatives can be seen as elements of purposive transitioning and of enhancing resilience and local production, but not necessarily with ecological sustainability as a primary goal. As in Samothraki, the desire for healthy, local, “organic” food may be a promising avenue for sustainability transitions of the food and land management system.

Another aspect of traditional food production, or quiet sustainability practices, which becomes evident in the analysis, is the fact that production has remained relatively stable during the past century even if population grew more than three-fold. The number of sheep has remained relatively stable, as have whale catches. Catches of sea bird have probably decreased, but this is mostly a result of the dramatic global decline in seabird. This characteristic of agricultural food provisioning practices in the Faroes may be contrasted with the changes occurring in the exploitation of the marine environment in the export-oriented industrial fisheries (and aquaculture), where production has increased dramatically, both in absolute numbers and per capita. In the Faroese case, two distinct spheres of social metabolism are arguably discernible in the differences between industrial and export-oriented production, and food provisioning practices that are oriented towards local production and distribution. Moreover, these distinct modes of social metabolism are producing very different cultural landscapes. The industrial metabolism of the Faroes consists of large material and energy flows, and further investments in industrial capital stocks, i.e., infrastructure, serve to reinforce a process of increasing metabolism that cannot be considered viable, at least not in a long-term perspective, and neither does it comply with the official sustainability goals of the Faroese Government. (The Faroese government has signed the Paris agreement and the Faroese parliament also in 2009 unanimously voted for passing a resolution to reduce greenhouse gas emissions by at least 20% relative to the 2005 emissions level in the decade between 2010 and 2020. In spite of these intentions, greenhouse gas emissions have increased by almost 10% relative to the 2005 emissions level.) In other words, maintaining this industrial landscape requires an ongoing and unsustainable flow of resources.

In contrast, traditional social metabolism in the Faroes produced a sustainable, diverse, and bio-productive landscape. The traditional Faroese land and resource management system presented in the previous section enhanced the bio-productive potential and capacity of the land to continually provide vital ecosystem services. This success was partly based on the ongoing investment in appropriate capital stocks including so-called landesque capital. The concept of landesque capital has been developed within the field of historical political ecology and may be understood as a specific form of capital stock, i.e., “enduring, non-alienable anthropogenic modifications of landscapes that increase physical productivity per unit of space” [84]. It enables an analytical discussion and separation between

two forms and strategies of growth, namely growth as a result of net increase of in-situ bio-physical growth, photosynthesis for instance, and growth as a result of resource appropriation from other systems. As the term of *landesque capital* enables analysis of this dimension of human-nature interaction, it is useful for investigating the long-term sustainability and productivity of land management systems, both in the past and in the future.

Various forms of *landesque capital* associated with the traditional land management system are still visible in the Faroese landscape. The stone walls, which marked the border between the infield and the outfield, are one example. Another typical form of *landesque capital* are the agricultural terraces, *bríkar* in Faroese, on the steep slopes of the infield. Reducing the steepness of the land made them easier to work and prevented soil erosion. A less visible form of *landesque capital* is the improved quality of soil and pastures through cultivation and grazing practices. All these forms of *landesque capital* required considerable and continuous investments of labor, as well as intimate knowledge of the environment. The Faroese landscape has been intensively exploited for close to two millennia, even the least accessible cliffs being used for grazing. And yet, most of the ecosystem services available to the first settlers were sustained or enhanced through the centuries and well into the twentieth century [67,69]. Even the biodiversity of the Faroese landscape may be considered a form of *landesque capital*, the ecosystem co-evolving with people to produce the Faroese cultural landscape. In this sense, the high levels of biodiversity and productivity of the traditional Faroese landscape should be seen as a result of human activity, not as something remaining in spite of it. Policy attempts at increasing food production or enhancing biodiversity that are not attentive to this crucial role of culture in processes of homogenization and diversification of ecosystems are bound to fail their goal.

The concept of *landesque capital* helps to illuminate the distinctions between different forms of capital stocks, and the implications of these for (island) sustainability and resilience. Material stocks, or capital, can materialize as commercial artefacts, such as disposable consumer goods, or as improved soil, depending on the cultural organization of social metabolism. The implications for sustainability and the bio-productive capacity of the natural system are compelling. While certain forms of industrial stocks, such as the industrial fishing fleet in this case, obviously serves to increase production, it also relies on very large volumes of external resource flows. When it comes to the fossil energy required to sustain Faroese industrial fisheries, the access to this energy is ultimately dependent upon global market relations or monetary relations. Changes in these relations are largely out of local control and may cause capital stock in the form of an industrial fishing vessel to become immediately unproductive. In comparison, investments in *landesque capital*, for instance in improved pastures and soil, is less vulnerable to external factors. As Widgren [85] (p. 61) puts it, *landesque capital* has a tendency to survive in different social contexts because “unlike monetary capital, which is fluid in space but fixed in time, *landesque capital* is fixed in space, but ‘fluid’ in time.” This makes *landesque capital* hard to appropriate in comparison to capital and resources that can be transported away. The formation of capital stocks as *landesque capital* or as some other form of stock has a lot to do then with how the social metabolism of a society is related to the outside world [9,86]. Interestingly, Petridis and Huber [83] (p. 282) in their discussion of quiet sustainability on the island of Samothraki direct attention to this potential association between *landesque capital*, dietary changes, and sustainability transformations. They propose that a reevaluation of older farming systems, such as agricultural terraces, and its association with changing dietary demands for local produce can work to increase both ecological and human health. A reevaluation of these older farming systems would, however, have to entail a reevaluation of the time required to maintain such forms of *landesque capital*, and more generally of maintaining biocultural landscapes. The issue of time and sustainability is also mentioned by Smith and Jelicka [21] in their discussion on policy changes to promote quiet sustainability. They suggest that more radical steps towards enhancing quiet sustainability would require consideration of economies of time within households and communities, for example, the length of the working week. The fundamental question of how people spend their time, how monetary

value is attributed to different modes of time use, and how that relates to both ecological and human well-being is generally overlooked in mainstream sustainability discourse.

5. Conclusions

The practices here defined as practices of quiet sustainability are rooted in a traditional land management system that was ecologically sustainable out of necessity. As they have coevolved in a society that has been increasingly connected to the global market economy and dominated and colonized by industrial social metabolism, they are also changing. Food provisioning practices such as sheep, livestock, and poultry rearing increasingly rely on imported animal feed, and the production of local feed, mostly straw fodder, is increasingly mechanized. The question of how a sustainable local food system can be organized in an open economy context requires a deepened and transdisciplinary understanding of how production is coupled to local ecosystems as well as to foreign ecosystems, and how this pertains to issues of resiliency, vulnerability, and sustainability. Chertow et al. [12] have explored these relevant themes in a discussion of four island societies that have consciously attempted to reconnect vital aspects of their economies to their natural systems. It is, however, crucially important that such processes are guided by adequate analytical insight into the complexity of sustainable coevolution as both a bio-physical process and a cultural process. While a recoupling of the natural system is always intended to enhance self-sufficiency and resilience, such efforts are not necessarily sustainable in the long term. As an example, efforts at reconnecting Faroese dairy production to the local natural system rather than to rely on imported feed could potentially entail a radical transformation of the Faroese cultural landscape into an agro-industrial landscape. Such transformation towards greater intensification and industrialization of agriculture would increase local production of feed, but considering the very limited land area suitable for mechanized cultivation, it would also contribute to the erosion and abandonment of what Tello et al. [87] (p. 52) have called “true biocultural landscapes,” entailing a loss of crops, breeds, knowledge, practices, and people.

In conclusion, distinct modes of social metabolism are discernible in the Faroes. An unsustainable industrial metabolism, governed by ideologies of growth, is colonizing and homogenizing the Faroese landscape. Another mode, which is rooted in the traditional land management system involves a direct metabolic connection between people and their landscape through food provisioning practices such as hunting and gathering, cultivation, and animal husbandry. It has been asserted here that these practices can be conceptualized as practices of quiet sustainability and that they should be acknowledged, guided, protected, and promoted, and in a concrete sense be given space in physical and land use planning, both in rural and urban settings. Rather than focusing too narrowly on sustainability transitions that are difficult to overcome and require large restructuring of society and technological infrastructure, as well as behavioral change, practices of quiet sustainability are already in place and deeply meaningful for people to engage in [88]. In Faroese policy discourse, traditional and alternative food-provisioning practices are perceived at best as supplementary to the “real economy,” but their dietary contribution has been shown to be significant in quantitative terms, and a considerable expansion of local food production could arguably be achieved within a quiet sustainability framework, particularly regarding fisheries and cultivation for direct human consumption. Such a trajectory would contribute to both human and ecological health, and would enhance biocultural diversity, resilience, food security, and food sovereignty. It would simultaneously expand the alternatives to the growth-oriented industrial production strategies currently dominating the islands. Further research into diverse and alternative food provisioning practices in the Faroes could provide important insight into how alternative modes and spheres of social metabolism are organized, maintained, and culturally negotiated, and how they can be expanded in order to reduce the social metabolism of human society without undermining human well-being. Thinking with this specific Faroese case and other cases of island metabolism(s), and through the metaphor of islanding, might also provide more general insight into how sustainable socio-metabolic spheres can be protected

and enhanced in a context of globalization and financial speculation in the struggle of forging less resource-intensive paths into the future.

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