



Rediscovery of small-scale fisheries in the era of crises

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Abstract

This article analyses the role of small-scale fisheries in the era of crises that increase fisheries' vulnerability. Crises may also trigger a reconsideration of the value of small-scale fisheries. Thus, our main research questions are twofold: 1) How do the recent crises directly affect small-scale fisheries? and 2) What are the opportunities for reinventing the societal and environmental benefits of small-scale fisheries? Answers to the research questions are based on a selection of interviews, email inquiry, research articles and reports in the context of Finnish small-scale fisheries. By focusing on these fisheries, operated in a Northern European welfare state, we study the potential that the new turbulent and uncertain circumstances could lead to acknowledgement of the multifunctional character of small-scale fisheries. The results show that climate change, Covid-19 pandemic and Russian invasion of Ukraine have challenged the resilience of Finnish small-scale fishing livelihood, albeit moderately. The prospects for new policies triggered by these crises stem from acknowledgement of small-scale fisheries' contribution to food security, environmental benefits and short supply chains. The best way to secure fish-based food security and sustainability during crises, is to keep the fishing sector and the production and distribution chains vital in normal conditions. We conclude that in a society like Finland the rediscovery of small-scale fisheries' future necessitates wide societal and political discussion about the pros and cons of the livelihood, together with inclusive governance that recognizes the multifunctional roles of small-scale fisheries in the era of crises.

Keywords Small-scale fisheries · Food security · Crisis · Governance · Finland

Introduction

Although small-scale fisheries have been marginalized in research and decision making for decades all over the world, they are of substantial relevance as part of primary production in local societies, cultures, and economies, accounting for 90% of employment in global capture fisheries (Pascual-Fernandez et al. 2020). In many European nations small-scale fisheries struggle for future existence in the shadow of industrial fisheries (Percy and O'Riordan 2020) and the marine aquaculture. Until recently, political attention to the small-scale sector has been relatively scant, but today small-scale fisheries are being rediscovered, for example, as a more responsible way of using resources and energy (Pascual-Fernandez et al. 2020). In modern societies there is a distinct demand for locally harvested fish, and appreciation of the

fishing culture and healthiness of fish diet. However, small-scale fishers' motivation to continue their work is strongly dependent on how the international and national governance systems support or hamper their activities and how the wider society views their importance.

Effective and inclusive governance is the most significant enabler of an equitable and sustainable blue economy (Evans et al. 2023). However, the expansion of hierarchic science-based fisheries and environmental governance systems during the 20th and early twenty-first centuries have narrowed the opportunities of small-scale fisheries, and often omitted to account for their real character (Gillette et al. 2022; Salmi 2015). Small-scale fisheries are hugely diverse in their operation and typically resilient to changing circumstances. Importantly, small-scale fisheries are multifunctional, meaning that they produce various types of societal benefits besides the fish food and can often adapt to changing circumstances (Salmi 2015). Local capture fisheries are capable of supporting food security during severe crises (Saiha 2021). Studies have also shown that the climate impact of small-scale fishing is low in comparison

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with many other food production systems (Silvenius et al. 2022). Many of the problems faced by small-scale fisheries are related to lack of wider understanding of their basic motivations and multifunctional activities. Moreover, larger scale operators are better capable of fostering their interests in the governance processes than small-scale fishers whose capacity for lobbying is often modest.

Besides the respective levels of power between primary production sectors, the way politicians and other decision makers see future opportunities also stems from the images they hold of small-scale fisheries. According to Jentoft et al. (2010) both the system-to-be-governed and the governing systems are formed according to particular images: “Once an image becomes shared and taken for granted, the image may turn into a norm and an outline for social action” (Jentoft et al. 2010). In the theory of interactive governance (Kooiman 2003), images constitute the guiding lights of “how” and “why” of governance. According to Kooiman and Bavinck (2005) images come in many types: visions, knowledge, facts, judgements, presuppositions, hypotheses, convictions, ends and goals. They are linked to action by governing instruments.

As described by Jentoft and Chuenpagdee (2022) the Blue Growth/Blue Economy agendas often neglect small-scale fisheries due to their disadvantaged and vulnerable position. As an alternative to these agendas, the concept of ‘Blue Justice’ has been introduced for better understanding the challenges around small-scale fisheries. From this perspective justice must permeate the ongoing interactions between small-scale fisheries actors and other stakeholders and be part of the governance discourse, practice and process (Jentoft and Chuenpagdee 2022).

This article focuses on the role of small-scale fisheries in the recent crises linked to the Covid-19 pandemic, the Russian invasion of Ukraine (Russo-Ukrainian war) and the climate change. Crises affect fisheries directly and adversely, but they may also provide a basis for reconsidering the value of small-scale fisheries. Our empirical case example is the Finnish small-scale fisheries (Salmi and Mellanoura 2020). By focusing on these fisheries operated in a Northern European welfare state, we study the impacts of crises, and on the other hand, the potential that the new turbulent and uncertain circumstances could lead to better appreciation of the multifunctional character and importance of small-scale fisheries. Thus, the main research questions are twofold: 1) How do the recent crises affect small-scale fisheries? and 2) What are the opportunities for reinventing the societal and environmental benefits of small-scale fisheries?

Answers to the research questions are based on a selection of fisher interviews, research articles and reports. The next section reviews the characteristics and challenges of small-scale fisheries by focusing on the Finnish context. In Sect. 3 of the paper, we study the consequences of crises

from the perspective of the fishing livelihood, while the following Sect. (4) elaborates the prospects for new images and policies that contribute towards rediscovery of the small-scale fisheries. Finally, we draw wider conclusions on how progress could be made towards better acknowledgement of small-scale fisheries and their roles in an era of crises.

Case study: framework and challenges of Finnish small-scale fisheries

Changing status of the Finnish small-scale fisheries

Historical transformation

For centuries the availability of fish in coastal and lake waters has been of major importance for the Finnish population and secured food supply for many also in difficult periods like famine or war. In Finland the frost can have destroyed the agricultural harvest totally, while fish in the waters remain alive and can be caught for food. For instance, in 1868, the darkest year of famine, when 8% of Finns died from hunger and disease (Häkkinen 2012), in many coastal locations the availability of fish helped the inhabitants to survive (Saiha 2021). The early 1900s were the heydays for small-scale fisheries in Finland. There were over 10 000 fishers along the Finnish coast and lakes. Even the outer coastal archipelago was populated by fishers. Baltic herring at the coast and vendace in inland waters were the main target species. They were salted and provided an important protein source for people in both the countryside and towns. At this time Finland was an autonomous part of Russia, and a lot of salted Baltic herring (*Clupea harengus*), sprat (*Sprattus sprattus*), vendace (*Coregonus albula*), smelt (*Osmerus eperlanus*) and salmon (*Salmo salar*) was exported to Russia. Seines and nets were the main fishing gears in coastal and inland fisheries. In addition to Baltic herring and vendace, pike and bream were the preferred fish species in the domestic market. Fishing was therefore considered as a vital source of living, and fish was an important product in foreign trade. Government actively supported the sector, for instance by paying a bounty for seals and white-tailed eagles (Pohja-Mykrä et al. 2005).

Russian fish demand and profitability of fishing would however collapse as Finland became an independent country in 1917. Discontinued export to the east was partly compensated by increasing export of salted herring and pike to Sweden, and later in the 1930s the profitability of fishing improved, when motorboats became more popular among fishers. Finland lost important fishing areas to Russia during World War II in 1945. During the war the government supported fishing and fish production with different supports and by relieving fishing regulations. After the 1940s the

number of commercial fishers began to rapidly decrease. The post-war reconstruction created a lot of new jobs, attracting young people from the archipelago and countryside to towns and to Sweden. Fishing livelihood was often considered less attractive, and its opportunities became narrower as almost all big northern rivers were dammed for electricity production, when large production areas of salmon and whitefish were destroyed. After several decades of legal proceedings however, these losses were compensated with restocking of salmon and whitefish, which created new fishing opportunities in the 1980s and 1990s.

Trawling became increasingly common in the 1950s with increasing industrialisation of fishing. Trawlers could provide large quantities of Baltic herring for fish processing and an expanding fur farming industry. However, in the 1970s the economic risks in capital-intensive trawling and fish processing increased, and the government began to support the profitability of Baltic herring and employment in fishing and processing sectors in coastal areas. The domestic fish market was protected from international competition. Fish processors were only able to get import licenses for some limited frozen fish raw material.

Expansion of fish farming created a totally new situation in the Finnish fish market. Until then Baltic herring had dominated the domestic fish market, but domestic farmed rainbow trout rapidly captured the market from especially Baltic herring from the 1980s. Predictable supply of farmed fish raw material ensured development of fish processing, distribution, retail trade and marketing. This process was further strengthened in 1995, when Finland joined the EU. The fish market was opened for fresh Norwegian salmon. Import of salmon has since steadily grown and imported salmon is today the main product and price leader in the Finnish fish market. Now half of the Finnish fish market consists of imported salmonids and a third of other fish products are also imported. Only 8% of consumed commercial fish originate from domestic fishing, and wild fish species are today niche products in the fish market. One third of it is Baltic herring mainly caught by trawlers, and the rest is vendace and various other fish species (for instance perch, pikeperch, whitefish, salmon, pike) caught by small-scale fishers.

EU-membership dramatically changed Finnish fisheries policy. Finland adopted the EU's Common Fishery Policy, which was originally constructed for large ocean fisheries countries. Finnish small-scale fishing with its peculiar characteristics such as ice fishing were totally strange in the EU. Finland did not have any producer organisations in the fishing sector, meaning that many EU-regulations were difficult to apply to the Finnish circumstances. Price support for Baltic herring was removed, but EU financial support for investments and development projects were introduced. Overfishing becoming an overwhelming challenge to the Common

Fisheries Policy, fishing regulations have intensified. The overall target to decrease fishing capacity has been difficult for the development of small-scale fishing. For example, investments on new fishing boats are forbidden. Nowadays the main focus of the EU maritime, fisheries and aquaculture funding is to enhance the sustainability of fishing.

Although many have left the occupation, the history of Finnish small-scale fishing livelihood shows how fishers have found novel ways of adapting to the societal transformations and changing availability of fish resources. After the mid-twentieth century, the Finnish coastal and lakeside communities had experienced a change from commercial utilization of fish resources towards environmental protection and leisure use, a so-called post-productivist transformation (Salmi and Mellanoura 2020). The remaining small-scale fishers were forced to adapt and change their practices to consider the new demands of environmental protection and leisure sectors. On the other hand, concern over the global food crisis, population growth and climate change started to redirect attention in the society back towards increasing production and food security (Almås and Campbell 2012). The production of renewable natural resources like fish is important again, but in a renewed form of productivism that emphasizes environmental perspectives and sustainability combined with production of natural resources (Rannikko and Salmi 2018).

Fishers in the society and nature

In countries like the Northern European welfare states, where the basic subsistence is largely secured by the state, people are not dependent on income and nutrition provided by small-scale fisheries in the same way as in the developing countries. In societies where the fishing livelihood is not a necessity for survival, fishers are motivated e.g., by the employment of culturally important nature-based livelihood, its independence and working environment, i.e., the life mode (Salmi 2005). At the same time, fishing livelihood has become marginalized in the modern society.

Most of Finnish commercial fisheries can easily be labelled as small-scale fisheries, covering both coastal and lake fisheries (Salmi and Mellanoura 2020). Although the open sea fishers account for approx. 4% of the total number of Finnish Baltic commercial fishers, they catch the major part of national landings by volume, mainly consisting of Baltic herring and sprat (Salmi and Mellanoura 2020). However, in 2021 small-scale fisheries accounted for more than 50% of the total value of landings. Most small-scale fishers are self-employed, own their fishing equipment and fish the waters close to their home with relatively small boats, using mostly gill nets and trap nets. Boats are typically equipped with an outboard motor and half of all these boats are shorter than 6 m.

Finnish small-scale fishers have adapted their fishing practices to the fluctuating seasonal availability of the targeted fish species like Baltic herring, pikeperch, perch, European whitefish and Baltic salmon. Fishing is typically discontinued for the ice cover period of 3–6 winter months. Nevertheless, some fishers also operate during the winter. Especially in lake areas, winter seining for vendace is an important fishing method enabling year-round operation, with fishers using snow mobiles, quad bikes or tractors to move on the ice. Fishing is a hazardous occupation with a high injury rate (Kaustell et al. 2017). On the other hand, studies have shown that Finnish commercial fishers are healthier compared with the average population due to the abundant share of fish in their daily diet. Due to their high serum concentrations of fish-derived fatty acids, the fishers and their wives have lower mortality from many natural causes, and less ischemic heart diseases compared to the general population (Turunen et al. 2008).

Small-scale fishers often hold a strong and positive professional identity justified by their role in supplying the basic needs of society (Hankonen 2010). They consider that working in nature is one of the main advantages of the occupation (Salmi 2005). Hankonen (2010) holds that a fisher may be more strongly and directly connected to the natural environment than any other practitioner: the fisher does not only live *by* harvesting natural renewable resources, he/she also lives *in* nature. A fisher harvests the surplus of naturally reproduced fish stocks and is thus more dependent on the uncertain and alternating nature than most other primary producers who can steer their production system. Successful and safe livelihood necessitates that the fisher holds experience-based ecological knowledge and understanding of the aquatic world.

The number of Finnish small-scale fishers has decreased since 1950. Along with wider societal transformations the fishers' status has also changed. In the past fishers were often considered as important members of the community – especially in villages where fishing was of high economic and cultural importance. For instance, more than 50 years ago, the co-operative seine net fishing for Baltic herring in the Southwestern archipelago could be considered as the symbol of the unity of a village (Lettinen 2004). The most experienced seine netters were highly appreciated as they possessed deep experience-based knowledge on the fishing locations, water currents and fish behaviour. Later, along with the growing attention on environmental protection, when a struggle against hazardous emissions to the waters was topical, commercial fishers were seen as sufferers of pollution and at the same time allies with the environmentalists (Salmi 2013). The respect and mutual understanding between fishers and environmentalists would, however, be broken by the strengthened international discourse of over-fishing and its effects on the world's fish stocks (Setälä and

Salmi 2022). This discourse begun to also affect the image of Finnish small-scale fisheries, irrespective of their actual effects on the fish stocks.

Challenges posed by governance

The consequences of the top-down science-based governance approach have become problematic for Finnish small-scale fisheries. Finnish fisheries and environmental policies have not always recognized small-scale fisheries as a sector that should be secured and developed. Despite a wider appreciation among the wider public and consumers on coastal and lake fishers and the nature-based products they supply, coastal fishers in particular suffer from severe problems and losses caused by seals and cormorants. Fishers are more and more frustrated because the local communities are prevented opportunities to tackle with the problem due to the conservation status of the species (Salmi and Svells 2022). Fishers would like to defend their livelihood opportunities by reducing the number of harmful animals. The fishers' inability to affect the situation has increased feeling of being disregarded by the governance system (Salmi et al. 2023). Conflict between Baltic Sea coastal fishery and, in particular, the grey seals has been severe since the mid-1990s (Varjopuro 2011; Bruckmeier et al. 2013). The direct seal-induced consequences faced by the coastal fishers include loss of catch (removal of fish or damaged fish), physical damage on nets and extra work necessary, for example, to repair damaged gear (Bruckmeier et al. 2013; Svells et al. 2019). Hidden losses, losses not visible such as catch taken without a trace or scared away from the fishing grounds also constitute a large part of the loss (Königson et al. 2007; 2009). The total societal costs of the grey seal experienced by the Baltic Sea fisheries and fish consumers have been extensive and much larger than the direct observed costs (Waldo et al. 2020; Johansson and Waldo 2020).

According to Suuronen et al. (2023) the management criteria for seals by HELCOM and EU are in conflict with the goals of the EU common fisheries policy that seek to ensure a reasonable standard of living for those dependent on the fishing industry. The EU ban on trade in seal products (EC 2009) is one of the main institutional barriers for moving forward in conflict mitigation. The ban restricts the economic use of hunted seals as a resource and decrease opportunities for local management of problematic seal individuals near fishing gear—and also management of the wider seal population.

Many studies show that tackling the problems of seal induced losses is a decisive challenge for the future of coastal small-scale fisheries not only in Finland but also in many other Baltic Sea countries like Sweden, Estonia and Denmark (Svells et al. 2019, 2022). There are, however, many other examples of unsuccessful governance

interventions that also have limited small-scale fishers' opportunities and belief in the decision-making system. Open sea and coastal salmon fishing has in particular been very tightly regulated. In 1970s and 1980s a large share of Finnish salmon was caught by drift lines and drift nets, but nowadays these fisheries are forbidden or strictly regulated in Finland. Salmon fishing is based on trap net fishing, which is also strictly regulated. The total ban of drift net fishing in the Baltic Sea from 2008 hit many small-scale fishers hard. This ban was initiated by the EU and terminated not only open sea netting for salmon, but also the traditional drift net fishing for Baltic herring and European whitefish (Salmi and Mellanoura 2020). Special boats had been developed for drift net fishing, which since the nineteenth century had played a key role in the year-circle of many communities along the coast of the Finnish Bothnian Sea (Salmi and Salmi 2009). The ban was motivated by the conservation of the porpoise. According to small-scale fishers, this case is one example of centralised decision making based on insufficient knowledge, as it is claimed, for instance, porpoises have very seldom entered Finnish coastal areas (Mellanoura 2015).

Meanwhile gill net fishing is also regulated by tightened mesh-size restrictions, which easily diminishes fishers' landings. For example, the raise of minimum allowed landing size for pikeperch was implemented contrary to the interests of small-scale fishers (Sonck-Rautio 2019). Increases in fishing restrictions serve to narrow the resilience of the livelihood, because fishers have less options in their palette of gear, target species and fishing seasons. A common denominator of small-scale fishers' challenges is that they would require changes in the hierarchic science-based fisheries and environmental governance systems (Salmi et al. 2023). Fishers' own adaptive responses are important but insufficient to revitalize the livelihood. Yet, influencing the images and structures of the governance system seems a big task for the small fisher sector. Consequently, fishers rarely recommend continuation of their work to their offspring.

As seen in the examples above, Finnish fisheries and environmental policies have not always recognized small-scale fisheries as a sector that should be secured and developed. Small-scale fishers' interests and values have become more marginalized within the wider Blue Growth/Blue Economy agenda (Salmi and Svets 2022). In the national programme for promoting domestic fish usage there is support for the opportunities for capture fisheries, but the most ambitious quantitative targets are set for growth in aquaculture production (Finnish Government 2021). This subsidiary position for small-scale fisheries stems largely from the narrow room for national level operation set by the Common Fisheries Policy framework and the fisheries funding schemes. However, in supporting small-scale fishers' investments or mitigating the seal-induced losses, the national authorities have been able to

Table 1 The empirical material used for assessing the consequences of crises in Finnish small-scale fisheries

	N		
	2020	2021	2022
Commercial fishers (interviews)	8	24	24
Fish processors and wholesalers (interviews)	11	11	8
Equipment industry (email inquiry)	-	-	4

implement supportive measures that fit into the narrow Common Fisheries Policy framework.

Methods

This study on the effects of crises and rediscovery of small-scale fisheries is based on a qualitative mixed methods approach rooted in case study design (Yin 2018). Consequences of international crises and prospects for new images and policies for Finnish small-scale fisheries are studied by combining interviews with fishers, fish processors and wholesalers, an email survey targeting ancillary sectors and literature. We use eight fisher interviews conducted in 2020 and 24 interviews in both 2021 and 2022 (Table 1). In general, these interviews focused on fishers' circumstances and their changes in the previous year. Special attention was given to fishers' responses to conflicts and crises, in particular the consequences of the Covid-19 pandemic.

The fisher interviews are used for exploring the consequences of international crises. Interviews with fish processors and wholesalers focused on fish market issues and deepened the understanding of how Covid-19 pandemic and the Russo-Ukrainian war affect the fish marketing chain. In 2022 also, an email inquiry was sent to manufacturers and sellers of fishing equipment. The questions concerned the consequences of the Covid-19 pandemic and the Russo-Ukrainian war. Four answers were received.

In the following section we study the consequences of global crises – climate and environmental change, the Covid-19 pandemic and the Russo-Ukrainian war – on Finnish small-scale fisheries. Based on interview and survey material it sets the scene for discussing the prospects for new images and policies. We summarize the small-scale fishers' position and orientate towards the impacts of crises and policy options that may help in rediscovering the images and roles of small-scale fisheries. For that purpose, we present findings from various documents, reports and articles.

Consequences of international crises

Climate change and the environment

Fishers seldom list climate change as the primary challenge of their livelihood but recognize its effects and future threats. However, a major transformation affecting both lake and coastal fisheries is the shortening of ice-cover periods that limit opportunities for winter fishing on ice. In Finnish lakes seine net fishing on ice is still ongoing as a traditional and technologically developed fishing method (Salmi and Mellanoura 2020), but along the Baltic Sea coast in particular, the formerly important wintertime ice fishing season with seine nets, gill nets or hooks has dramatically shortened. Winters totally without ice cover are nowadays common at the southern Finnish coast. This extends the fishing period on open sea, but deepens the problems with seals, because they can be present at the coastal areas all-over the year. Furthermore, although lakes may be still frequently ice covered, the lake fishers interviewed noted that the mild and rainy winters and water on the ice makes it difficult for the fishers to move and operate on the ice.

During hot summers fishers have noticed mass death of fish and fish fingerlings in some shallow lakes in southern Finland, which creates worries for the future of cold-water fish species like European whitefish and vendace. There is a clear tendency that cold-water fish species like European whitefish are declining and warm-water fish species like perch and pikeperch are benefiting from the climate change. As a consequence, pikeperch is nowadays the second most valuable fish species in inland fisheries (Natural Resources Institute Finland 2023).

In interviews the Finnish small-scale fishers commented that storms have increased, and the weather has become more unpredictable. Weather conditions like the wind directions no longer follow the patterns they used to. This somewhat complicates the livelihood, as due to the increased randomness fishers cannot rely on their local experience-based knowledge for finding the best fishing grounds. Fishers' expertise in the seasonal behavior of fish, and how the behavior is affected by changes, for example, in wind or water temperature, has become less usable. Coastal fishers, for instance, claim that warming of water temperatures during the summer decreases the quality of herring and hampers herring fishing because the fish are more dispersed.

Coastal small-scale fisheries are affected by the major environmental problem of the Baltic Sea, eutrophication. Nutrient loading originates from multiple sources, including agricultural runoff, ditched forestry areas, industry and community wastewaters (Varjopuro 2000). The nutrient

runoff from land is a major source of eutrophication problems especially in the shallow archipelago regions. This nutrient runoff is partly due to agricultural practices but also to a wide extent a consequence of climate change: today nutrients flow to the sea nearly year-round unlike before when the winters were colder and longer, and the ground was ice or snow covered. A concrete hardship highlighted by the fishers is that their fishing gear becomes quickly dirty and less efficient due to the large amounts of algae. This means more work, as the fishers have to check and clean their nets more frequently. Although the fishers suffer from the consequences of climate change, they are also part of the remedy: many fishers stress that when fishing they also remove nutrients from the Baltic Sea.

Eutrophication and warming of the water may increase productivity, but also lead to a change in the composition of the fish populations with a turn towards lower value species like smelt, roach and bream. In recent years there have been several projects to develop new markets for these under-utilized species and some fishers have begun to fish them especially during the spring fishing season. In coastal fisheries, catches of valuable fish species like salmon, whitefish and pikeperch have decreased. The seal and cormorant populations are viewed as the primary reasons for smaller catches of these fish species, but climate change and eutrophication are also of importance. Fishers have reacted by increasing the value of their catches by concentrating more on selling self-processed fish products, such as smoked fish and various types of canned marinated herring, directly to consumers (Setälä and Salmi 2022).

Covid-19 pandemic

The Covid-19 pandemic had a marked effect on the Finnish small-scale fisheries sector. The disease itself had little or no effect on small-scale fishing at the operational level but temporarily it affected opportunities for marketing of the landings.

Wild fishes are niche products, which fishers and fish wholesalers often sell to restaurants. The closure of restaurants and eateries suddenly cut off this marketing channel. Therefore, many fishers were forced to decrease fishing, deep-freeze or process fish or search new markets in the wholesale or retail sector and increase selling direct to consumers. In contrast, the wholesalers and fish processors could soon compensate for their missing sales in the restaurant sector with increasing sales to the retail sector. However, the main product for them was imported salmonids. Norwegian salmon export to Asia and Europe had collapsed due to the flight restrictions, various distribution problems and closure of the restaurant sector in Europe. As the demand for salmon diminished, Norwegian fish farmers were forced to lower prices and sell farmed rainbow trout

and salmon to neighboring marketing areas like Finland. Therefore, the fish counters in the retail stores were not an attractive alternative for small-scale fishers due to the low demand and price level. In the lake area, vendace trawlers faced the biggest problems, because they almost totally lost their main market.

Most of the interviewed fishers explained that after the chaotic spring season in 2020 they noticed that demand for local fish began to grow. People were not able to travel abroad, and they increasingly spent holidays and money in the home country. Under the circumstances many consumers liked to buy their fish directly from the producer rather than from a retail store and appreciation of local food production grew. People began to think for the first time in a long while about national food security and the vulnerability of long value chains. Also, the number of small-scale fishers' customers grew because many Finns remote worked at home or in the summer cottage and preferred fetching fish directly from the fisher rather than from retail store.

Processing of self-caught fish and selling the products directly to consumers became an important survival strategy for many coastal and lake fishers. For many, this added value strategy was not a new one, because in Finland there is a centuries long history of fishers' direct sales in fish marketing events and marketplaces (Hultman et al. 2018). The importance of these added value strategies had grown already before the Covid-19 epidemic in coastal fisheries because of the decreased landings due to the seal and cormorant-induced losses. However, during the first year of the epidemic marketing events were cancelled, and in some cases also marketplaces were closed. As, for instance, a lot of vendace is fried and sold to customers during various marketing events around Finland, the diminished demand due to 2020 closures put many lake trawlers out of work. Fishers received partial compensation for the cancellation of marketing events and the government also supported fishers' investments in fish handling and fish processing to relieve negative impacts of the Covid-19 epidemic.

In general, Finnish small-scale fishers we interviewed found that their situation through the pandemic to be positive, as the appreciation of local fish products among the consumers has grown. Fishers had also learned to use new channels like the Internet for more fluent marketing of their products.

Russo-Ukrainian war

Russia attacked Ukraine in February 2022. In the beginning of the war, export of Baltic herring and smelt to Belarus and Ukraine decreased and the domestic fish feed factory stopped export of fish feed to Russia. These changes affected large-scale trawling but had no direct effect on small-scale fisheries. More widespread problems, however, were caused

by rapidly growing fuel and electricity costs. High electricity prices increased costs of especially freezing and processing of fish. Increasing oil prices raised the price of fish boxes, nets, trawls and other fishing equipment. Fuel prices were doubled, which made especially the energy-intensive trawl fishing unprofitable. High fuel prices created challenges also for small-scale fishers, although their energy costs are often relatively low. In 2012 the Finnish government decided to grant financial support to commercial fishers for compensating their weakened economic situation due to the Russian attack towards Ukraine. For small-scale fishers the sum was 7% and for large-scale trawlers 15% of their total costs (Finlex 2022).

At the same time food prices increased, and especially the price of imported salmon jumped sky high in the spring 2022. This was due to decreased supply of salmon at the same time as production costs grew. Higher salmon prices gave price advantage to wild fish. Small-scale fishers benefited from higher fish prices, which compensated the increased cost level. However, along with the rise of food costs the purchasing power of consumers sank, which meant that they preferred cheaper food products. Small-scale fishers we interviewed said they had to think carefully of product prices in their direct selling: what price level is reachable for consumers and at the same time sufficient to cover the raised costs. Although the price of many Baltic herring products has increased, they still remained competitive compared with farmed fish and many meat products.

Even more concretely than the Covid-19 crisis, the new war highlighted the wider importance of self-sufficiency and security of supply. As a consequence, the Government has updated Finland's contingency plans, with the self-sufficiency plan for the fisheries sector updated for the first time since 1993 (Setälä et al. 2024). This plan includes various recommendations on legislations to secure supply of fishing products during a state of emergency, considering, for instance, easier entry to fishing grounds and relief on seal hunting regulations. The plan also recommends that during a state of emergency a larger share of the Baltic herring landings are directed for human consumption and that the most important raw material for fishing gears are stored in reserve stocks.

Prospects for new images and policies

Crises like climate change, the Covid-19 pandemic and the Russo-Ukrainian war are serious and devastating in their societal consequences. As described in the previous section they also challenge the resilience of Finnish small-scale fishing livelihoods. As noted earlier, crises may also open new opportunities that provide a basis for reconsidering the societal role and governance of small-scale fisheries. In this

Table 2 The main effects and prospects for new policies related to conflicts and crises in the Finnish small-scale fisheries

Conflicts and crises	Effects	Prospects
Climate change and environment	Increase of uncertainties	Recognizing the environmental contribution of local fisheries
Covid-19 pandemic	Comparably minor effects	Appreciating the role of short supply chains and local fishing livelihood
Russo-Ukrainian war	Minor effects	Growing acknowledgement of the role of domestic fishing in food security and being prepared for emergent crises

section we therefore disclose the multidimensional benefits of the fishing livelihood, which are typically neglected in public debate and policy formation.

Table 2 outlines general conclusions about the effects of the studied crises and outline prospects for new images and rediscovery of the small-scale fisheries. The crises have increased uncertainties in the fishers' operational framework and caused challenges due to changes in fish demand and increase in the operational costs. However, the prospects for new policies that the crises could trigger relate to growing acknowledgement of their environmental benefits and contribution to short supply chains and food security. First, we focus on the environmental and social benefits of the Finnish small-scale fisheries and secondly, in particular, food security.

Environmental and social benefits of small-scale fisheries

Because the Covid-19 pandemic decreased fish demand in the wholesale sector, coastal and lake fishers increased their effort in fish processing and direct marketing. This strategy was supported by allocation of national subsidies. They were ready to drive long distances in order to avoid crowds because of the Covid. Fishers hoped that the increased appreciation and demand for domestically and locally produced fish would continue also after the crisis. It is possible that direct contact between fishers and consumers has created a foundation for long-lasting business relationships, with the personal connection between customers and fishers reopening possibilities for mutual understanding and respect.

The healthiness of fish diet to the population is unquestionable. For instance, according to Tuomisto et al. (2020) Baltic herring and salmon contain omega-3 fatty acids and vitamin D, and the beneficial impact of these fishes on cardiovascular diseases, mortality, and the risk of depression and cancer clearly outweighs risks. The National Nutrition Council recommends that fish should be eaten at least twice a week and different fish species should be varied in the diet. If this target should be reached, the demand for wild fish supplied by small-scale fishers would also increase.

Parallel to the any socio-economic or cultural benefits of the livelihood, many aspects speak in favour of environmental benefits. Many Finnish fishers harvest the so-called low

value fish species and supply these to the market. This helps removing nutrients from the waters and fighting against the eutrophication problem in the Baltic Sea. Almost 600 tonnes of phosphorus and 3000 tonnes was removed from Finnish waters in 2021 by fishing, which corresponds to about 24% of phosphorus and 6% of nitrogen loads caused by human activities in Finland.¹ The overwhelming part of the removal is due to the open sea trawling, but some part of the utility comes also through small-scale fisheries in the shallow water areas where loading has most critical effects. Finns are aware of nutrition loads of agriculture and understand the importance of nutrition removal. Fishing is therefore increasingly becoming a part of circular food production system (Finnish Government 2021).

Promoting and consuming products of small-scale fishing is also becoming an act in combating climate change. According to Silvenius et al. (2022), the climate impact of fish captured by Finnish small-scale fishers is small compared with other animal production, also in comparison with fish farming. The mode of gathering the surplus of natural resources, together with small investments, make small-scale fisheries' input in the production smaller in comparison with the farming economy. Most often fishers use passive gear and live relatively close to their fishing grounds, which keeps the fuel costs at a moderate level. However, the impact varies substantially according to fishing methods and fuel consumption. The smallest climate impact is in trap net fishing for Baltic herring and seine net fishing for vendace (Silvenius et al. 2022).

Food security

As shown in this article the recent crises, especially the Russo-Ukrainian war, have refocused emphasis on securing national food security, of which small-scale fisheries plays its part. In Finland food security is considered as particularly important, because of the closeness to Russia and vulnerability of transportation. A severe crisis, for instance in the Baltic Sea closing the most important transport routes, would halt most of the import of food and crucial inputs for food production. In this situation the supply of fish is

¹ Setälä J., calculation based on Mäkinen 2008.

particularly vulnerable as two thirds of Finnish fish consumption is imported fish, albeit mostly from neighbouring Norway.

Among the Finnish consumers the share of domestically produced fish products is substantially smaller than that of agricultural products. Finland is almost self-sufficient in most of the agricultural products such as pig, beef and grains. In very severe crisis, such as a war, the self-sufficient use of national fish resources for food would become pivotal. Finland has a long coast and thousands of lakes, fish being an important fresh renewable animal protein reserve in the water systems around the country. In addition to the local renewable natural resources, the fish, the existence of skilled fishers with the capacity and gear to harvest large quantities would become highly important.

Better consideration of food security in fisheries and environmental policies would mean that attention would be given to sustaining commercial fisheries and their operational conditions. As fish resources and the citizens are spread around the nation, fishers and fishing capacity should also be dispersed. Water ecosystems are complex and resilient. They are also capable to adapt, if fishing intensity needs to level up for increasing fish food supply. Water ecosystems are possibly more resistant than terrestrial systems to secure food production in Finland, because shocks caused by climate change may cause devastating impacts on agriculture, where conditions are already extreme and limited (FAO 2024).

During the recent crises it was noticed that importing, fish farming and open-sea trawling were vulnerable food supply chains. Different crises may have substantial effects on global distribution chains, imports and prices of necessities, for instance fertilizers, energy, feed and food. The price of fuel is essential for trawl fisheries and electricity prices are important for the processing industry. In a war situation, it is questionable if open-sea trawlers would be able to fish at all. Moreover, fish farming is dependent on the import of certain feed ingredients. In comparison, small-scale fishing consumes less fuel and is more based on fishers' skills and nature, which would make it more resilient towards outer shocks and disturbances.

Discussion and conclusions

In this paper we have explored how the recent crises have affected Finnish small-scale fisheries. It has shown how most fisher families have been able to cope rather well with the effects of the pandemic and also regarding the consequences of the Russian attack on Ukraine. Climate change has increased uncertainties of the occupation, but in general the Finnish small-scale fisheries have shown remarkable resilience. Fishers show capacity to accommodate (see Bruckmeier 2016) to rapidly changing

circumstances and as history shows fisheries can respond to crises rapidly and innovatively (Saiha 2021).

Yet, the crises have also highlighted new opportunities and images pertaining to the status of small-scale fisheries, and to rediscovering the multifunctional societal role of the fishing livelihood. This will require a change in how fisheries are imagined and governed, built on the societal benefits of small-scale fisheries, as well as tackling immediate problems linked to the seal and cormorant-induced losses along the Baltic Sea coast.

Since the twentieth century, Finnish capture fisheries have been overshadowed by agriculture and forestry, which have gained a high position on the Finnish society (Eklund 1993). The fisher folk in the archipelagos have often considered as unjust the contrast between state's encompassing support to agriculture and its minor attention to the fishing livelihood (Järvinen 2019). However, the marginalization of small-scale fisheries is essentially a governance issue rather than an inevitable course. The latest transformations, especially the increased appreciation of local fish products due to the Covid-19 pandemic and the war in Ukraine, may reinforce pressures for changing small-scale fishing policies.

The multiple benefits, whether it be the low climate impact, human health benefits, nutrient removal from the Baltic Sea and food security, resonate with the present societal values and needs for tackling the detrimental crises. In spite of this, it is not easy for a small occupational group like commercial fishers to succeed in the 'image battle'. For instance, the Finnish and Swedish (Gillette et al. 2022) green lobby groups sometimes view fishers as 'cheaters' or 'overfishers' rather than exercisers of a nature-based and advantageous livelihood. In contrast, the fishing livelihood, together with its effects and outcomes, is often acknowledged by many, but still fisheries or environmental policies that hinder their development persist.

Although in Finland some attention has been refocussed towards securing the use of national fish resources in case of a crisis, the fisheries and environmental policies have not yet remarkably changed towards this direction. However, the best way to secure functionality during crisis, would be to keep the fishing sector and related production and distribution chains intact and robust during normal conditions. Redefinition of the small-scale fisheries' future necessitates wide societal and political discussion about the pros and cons of this livelihood and governance that recognizes the multifunctional roles of small-scale fisheries in the era of crises.

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Declarations

Competing Interests The authors have no competing interests to declare that are relevant to the content of this article.

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