JOHN NURMINEN FOUNDATION'S LOCAL FISH PROJECT

Final Report

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John Nurminen Foundation 2020

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"If you want to make your living through fishing, you have be ready to try new things. Also, I've been sorry to see fish go to waste.
Now we can utilize everything, to the greatest extent that is possible."
- Jukka Toivonen, fisherman. HS 22 May 2016 -

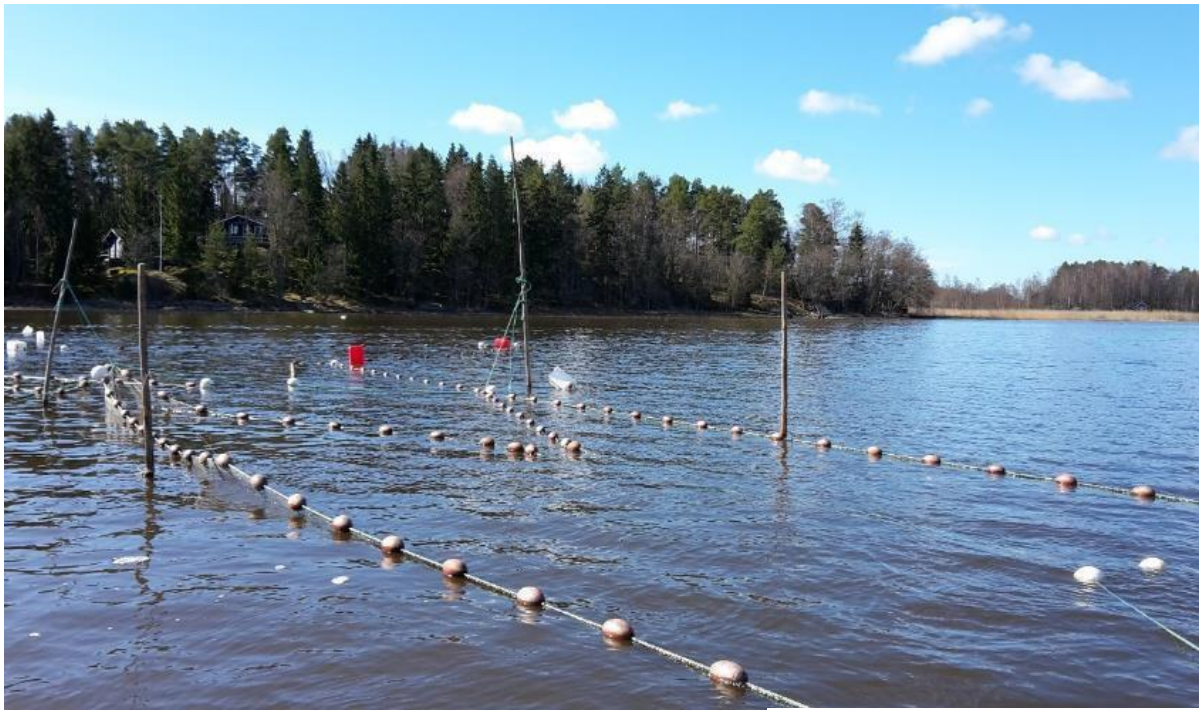

Image: Miina Mäki, John Nurminen Foundation

Local Fish project in brief

The objective of the John Nurminen Foundation's Local Fish project was to recycle a significant volume of nutrients from the Archipelago Sea marine ecosystem to land, and, consequently, to support land-based nutrient load reductions that aim at improving the status of the Archipelago Sea, and to promote the local and nationwide utilization of domestic, underused fish species in food products by creating a permanent domestic market for products made of coastal cyprinids. The project was launched in 2015, and it ended at the end of 2019.

The Local Fish project was implemented in two phases. In the first phase in 2015–2016, a functioning value chain for bream and roach fished from the Archipelago Sea was built in the Turku region, in cooperation with local stakeholders committed to the project. The objective of the pilot phase was to support the creation of a local market for local fish products, and to assess the opportunities, challenges, and bottlenecks of the operation first in smaller scale. In cooperation with Kalaliike S. Wallin and the Turku-based food service company Arkea, a local fish patty made of bream, intended for large-scale kitchens, was created and delivered to the institutional kitchens of the Turku region and nearby municipalities, e.g. to schools, day care centres, care facilities, and to staff restaurants.

In the second phase of the project, the production and marketing area of the local fishing products was expanded gradually to include the institutional kitchens of the Helsinki area, for example. Moreover, a consumer product (Pirkka Saaristolaiskalapihvi) made of bream was launched in cooperation with Kesko, and the product was very well received. The products are manufactured by Apetit. At the end of 2020, there are three retail products made of bream under the Pirkka brand.

During the project, a total of almost 700,000 kg of bream and roach was fished from the Archipelago and Bothnian Seas, with approximately five tons of phosphorus removed from the sea with the catch. The project received a lot of positive publicity and managed to raise the image of Finnish cyprinids as a food fish. This visibility helped in creating a consumer market for cyprinid products launched both within and without the project.

Background and objectives of the project

The driving force behind the Local Fish project was the desire to boost the recovery of the Archipelago Sea, which suffers from eutrophication. With the annual fish catch of Finland, a significant amount – more than 700 tons – of eutrophication-inducing phosphorus is recycled from the waterways to land. Even though the reduction of external nutrient loads is essential in mitigating the eutrophication, fishing that targets cyprinids can remove a significant amount of nutrients from the marine ecosystem, and thus complement the measures reducing the nutrient load on land.

Background

The status of the Archipelago Sea is the worst out of all Finnish coastal waters, and, according to the estimates of researchers, cyprinid stocks in the area have grown in the past years. Eutrophication is considered to be a partial cause for the increase in cyprinids, as various species, such as bream and roach, benefit from it. Cyprinids may also boost eutrophication by eating zooplankton, which curbs algae growth, and by releasing nutrients from the bottom sediment to water as they dig for food. According to fish stock studies, fish growth is slow in the Archipelago Sea and the Gulf of Finland, which would indicate that the volume of cyprinids is too large compared to the food resources available for them. Growing cyprinid populations also compete for food with other fish species that are more important to the economy. Many studies on fish stock management in lake areas have indicated that the efficient fishing of cyprinids can improve fish growth and give more room for predatory fish, thus balancing out the fish stock structure.

In lakes, cyprinid stock management is a very common water restoration measure, whereas in coastal waters, targeted cyprinid fishing on a larger scale was implemented for the first time in the state-funded pilot in 2010–2011 (Setälä et al., 2012). The objective of the project was to promote the utilization of low-valued fish, such as roach and bream, and to make cyprinid reduction fishing a commercial operation. The project tested whether the fish could be used in food products, and also studied other utilization alternatives, for example use as a raw material for bioenergy, or preservation with acidification. Acidified fish could be utilized as feed in fur farms. Export markets for cyprinids were also opened up, but some of them were later closed as EU's economic sanctions against Russia came into force in 2014; also, when state funding ended, some of the operations seeking to utilize cyprinids came to a close. At Pickala Bay, the reduction fishery project also created a strife related to fishing sustainability between various interest groups, which also to some extent made the operations of project stakeholders more difficult. In the Archipelago Sea, some of the fishermen who participated in the project were nevertheless interested in continuing to fish cyprinids, even after state funding had ended.

The research conducted in connection with the pilot project at Pickala Bay did not find that reduction fishing would have had an impact on the bream stock of the area, or in water quality variables (Jokinen & Reinikainen 2011). According to the research report, this conclusion may have been due to insufficient data, or to the fact that the fishing did not have an observable impact. On the other hand, the data on the fish stocks of the bay prior to the reduction fishery project were, according to various experts, not complete, and a more thorough follow-up would have been necessary. The research report nevertheless states that bolstered cyprinid fishing is a potential

measure in reducing eutrophication in coastal waters, alongside other measures that reduce external nutrient loads.

The John Nurminen Foundation's interest in fish stock management was awakened after being contacted by the fishermen in the Archipelago Sea; the Foundation began working on a project plan that would remove nutrients from the sea by fish stock management, and, at the same time, develop sustainable further use for the cyprinid catch as a food product, e.g. as an environmentally friendly alternative for industrial meat or imported fish. Promoting the vitality of fishing as a livelihood in the coastal areas was also seen to be an important factor in strengthening the local nutrient streams from sea to land, and safeguarding the traditional culture of the archipelago.

The Local Fish project was prepared in close cooperation with the Natural Resources Institute Finland, the Ministry of Agriculture and Forestry of Finland, the Centre for Economic Development, Transport and the Environment of Southwest Finland, experts from the local working group for the fisheries industry, and local fishermen and entrepreneurs of the fishing industry. Prior to launching the project, discussions were also active with other stakeholder groups, such as recreational fishers and fish biologists, with the aim of creating practices for sustainable fish stock management, and obtaining social approval for the project's operations. From the very beginning, the project's operational principles were sustainable fishing, open communications, and transparency.

Objective: Recycled nutrients and local fish at dinner tables

According to estimates, more than 700 tons of phosphorus are recycled annually in Finland from the waterways to land. According to research (Setälä et al., 2012)*, the phosphorus content of cyprinids is roughly 0.7 – 0.8% of their wet weight; this means that with a roach and bream catch of one million kg, approximately 7-8 tons of phosphorus is removed from the waterways, equalling nearly twice the annual phosphorus load entering the Archipelago Sea from the Kakolanmäki, Turku wastewater treatment plant. The objective of the Local Fishing project was to remove nutrients from the Archipelago Sea by launching a commercial fish stock management operation that is sustainable ecologically, socially, and economically. The project also sought to direct the fish caught through fish stock management to further use and processing into foodstuffs.

Demand for domestic fish is growing in Finland, but in spite of this fact, up to 80% of the Finns' fish consumption is still imported, mostly comprising salmon farmed in Norway. Increasing the supply of locally produced fish in the offerings of industrial kitchens, such as school canteens, for example, was seen as a way to reduce the nutrient flows that enter the Baltic Sea catchment area from elsewhere, and, thanks to shorter transportation needs, also as an environmentally friendly alternative for industrial meat production or imported fish.

Local production was also considered to have a positive impact on the local economy and employment. Traditional coastal fishing is an important part of the culture of the Archipelago Sea, and hopes were high that increasing the appreciation of cyprinids, which was one of the project's goals, was a way to increase the profitability of traditional archipelago fishing and related production chains, and, consequently, increase the supply of domestic fish to consumers.

* Setälä, Airaksinen, Lilja and Raitaniemi 2012. Pilottihanke vajaasti hyödynnettyjen kalojen käytön edistämiseksi. Final Report. Finnish Game and Fisheries Research Institute work reports, 10/2012, 72 p.

Implementation

The Local Fish project was implemented in two phases in 2015–2019. The project's two-year pilot phase first built a functioning local production chain in the Turku region. The objective was to support the creation of a local market for local fish products, and to assess the opportunities, challenges, and bottlenecks of the operation first in smaller scale. In the second phase of the project, the production and marketing area of the local fishing products was expanded gradually to include the institutional kitchens of the Helsinki area, for example. Moreover, the project identified suitable partners for bringing the consumer products to the market, and supported the creation of a permanent demand for cyprinid products in industrial kitchens and by consumers.

Fishing

Fishing in the Local Fish project targeted underused species of cyprinids, bream in particular, which, according to estimates of the Finnish Natural Resources Institute, was considered to be overabundant (Setälä et al. 2012). The observations of the fishermen active in the area told the same story: the share of bream in the catches of the coastal fishermen, for example as a side catch of other fish caught with nets, was up to 50% in certain locations at the beginning of the project.

To ensure the ecological and social sustainability of fishing within the Local Fishing project, fishing was restricted with rules drawn up together with stakeholder groups (Appendix 1), to which all involved were committed to. All fishing within the project was implemented with traps from which unwanted catch, such as all predatory fish, could be released alive. This is also why the side catches of other fishing done with nets could not be utilized in the project. In practice, most of the traps used by the fishermen within the project were open fyke nets (Fig. 1) from which the catch is lifted to the boat with a hand net.

Figure 1. Example of a cyprinid fyke net used in the project. *Image: Miina Mäki, John Nurminen*

Fishing rules in the Local Fishing project

The Local Fishing project wanted to avoid conflicts between the various fishing interest groups, such as those that arose in Pickala Bay during the state-funded reduction fishery project of 2010 – 2011: this is why particular attention was paid in project preparation to ensure the ecological and social sustainability of the fishing, and the transparency of the operation. Prior to launching the project or the fishing operations, the Foundation spent a great deal of time listening to both the various fishing stakeholder groups, and the fish stock researchers from the Natural Resources Institute Finland and the Finnish Environment Institute. Based on these discussions, procedures were created that would be acceptable for all stakeholder groups as the principles of sustainable cyprinid fish stock management (*Appendix 1*).

Fishing within the Local Fish project was restricted to underutilized cyprinids, and other fish, such as endangered fish species and predatory fish, were released from traps back to the sea, and itemized on reports to the Foundation using a separate form. Project traps also had to be checked separately from other traps, and fish from other traps could not be brought to the shore at the same time with fish caught for the project. In order to ensure the practical appropriateness of the rules, the Foundation hired a supervisor for the project. Supervision was conducted with unannounced check-up visits to traps and fishing harbours during each fishing season. Trap placement was also restricted so that protected areas remained outside the fishing area, and all traps were to be placed within an adequate distance from river mouths.

Fisher recruitment and fisher agreements

Fishermen for the project were selected annually in January-February via an open call (*Appendix 2*). The call for applications was published on the John Nurminen Foundation webpages, and the project and the call for fishermen were also communicated via coastal fishing industry working groups, and in the info sessions organised annually for the fishermen of the Archipelago and Bothnian Seas. In its first year, the project had five fishermen participating, and in the following years a total of 8 to 12 fishermen annually from the Archipelago Sea and nearby areas. After the pilot phase, the operating area of the project was expanded, and in 2017 to 2019 a similar number of fishermen from the Gulf of Bothnia, Uusikaarlepyy region joined the project (Fig. 2).

Each year, participating fishermen committed to the rules defined for the project with an agreement, and also reported to the Foundation both on their raised catch and the fish that were released at each trap and for each check (*Tables 1-3, summary of catch reporting*). Trap locations were checked beforehand by the project, and checked traps were marked. Reporting was done with a Google Forms spreadsheet drawn up by the project, and data entry was simple to do also with a mobile device. The Foundation paid contract fishermen a phosphorus removal fee in the amount of 0.531€/kg for the cyprinid catch that could be utilized in the food supply chain (page 10). The cyprinid catches fished for the project were sold at market price, primarily to the food processing companies who had agreed to cooperate with the project. With this procedure, the balance of fish supply and the raw material needs of the value chain could be ensured, so that as large a share as possible of the catch could be sustainably used in the food supply chain. During the project, the fishermen also invested in the development of traps and fish handling (Fig. 3).

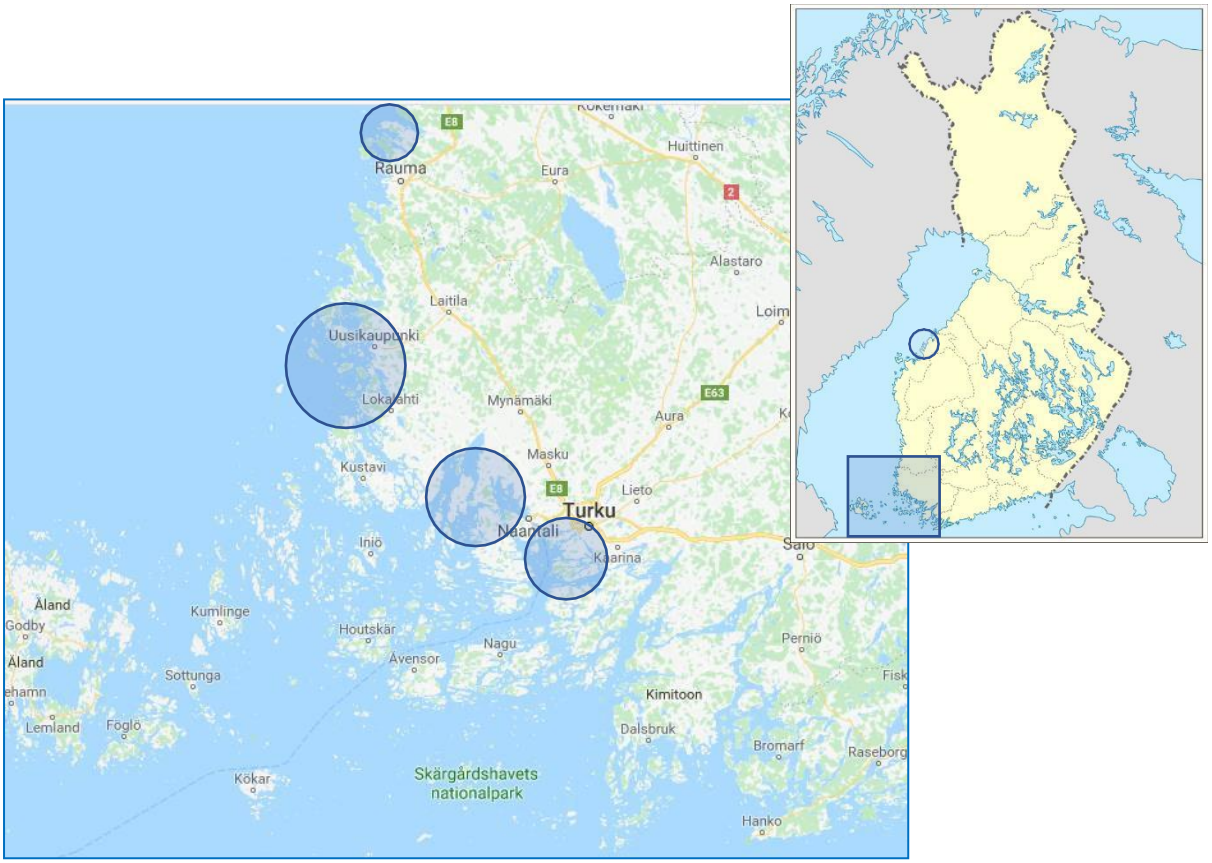

Figure 2. Fishing areas of the Local Fishing project, 2015–2019. *Map image: Google Maps*

figure 3. "Jukka Toivonen developed a conveyor belt and sorting system especially for the project, and the fishing couple invested €30,000 in traps and logistics. The fisherman very much hopes to be able to use this equipment for a long time." *Interview of Jukka Toivonen, HS 22 May 2016, Image: Miina Mäki, John Nurminen Foundation*

Table 1. Cyprinid catches within the scope of the Local Fish project phosphorus removal fee, 2015–2019.

Fish catches	2015	2016	2017	2018	2019	Total
Cyprinids, kg (bream 90%, roach)						
Archipelago Sea	42,884	148,686	83,696	99,080	61,141	435,486
Gulf of Bothnia	-	-	96,443	68,524	98,632	263,599
Both, total	42,884	148,686	180,139	167,604	159,773	**699,086**

Table 2. Side catches, by species, summary 2015–2019

Side catches, kg	Total
Small perch	1,994
Smelt	117,898
Baltic herring	215
Ruffe	1,515
Rudd	60
Ide	500

Table 3. Fish released from the traps, by species, summary 2015–2019

Species, pcs	Pike-perch	Whitefish	Pike	Trout	Salmon	Rainbow trout	Burbot	Flounder	Perch	Eel
Archipelago Sea	5,535	397	392	101	6	4	65	25	310	2
Gulf of Bothnia	655	368	654	58	3	-	240	-	1	-
Total	**6,190**	**765**	**1,046**	**159**	**9**	**4**	**305**	**25**	**311**	**2**

Phosphorus removal fee

The contract fishermen of the Local Fish project were paid a phosphorus removal fee of €0.531/kg for their cyprinid catch as an environmental subsidy. The phosphorus removal fee was intended not only as a compensation for the phosphorus removed from the sea with the fish catch, but also as an incentive for the fishers to invest in their fishing equipment and commit to the new kind of practices required by e.g. the project's rules. The prerequisites and rules for project participation and phosphorus removal fee payments for the cyprinid catches were itemized in fisher agreements, and communicated in connection with the annual call for fishermen; in addition, the information was published on the project's website.

The phosphorus removal fee was paid out annually based on receipts delivered to the Foundation, applying the following requirements as specified in calls for fishers, fisher contracts, and on the project's website:

1. The objective is to remove nutrients from the sea by fishing cyprinids, and to direct as large a share of the fished cyprinids as possible, i.e. a minimum of 70% of the average catch, for use in food production.
2. The catch is primarily delivered to the project’s partners, who pay a market price for the share of the catch that fulfils quality criteria and will be used in food production. The fishermen conclude agreements on the sale and delivery of the catch themselves, working directly with the buyers.

3. The basis for the phosphorus removal fee is a compensation of €66.37 for each kg of phosphorus removed from the sea. This means that the fee for a kg of caught cyprinids is set at €0.531.
4. The phosphorus removal fee can be paid for a catch that is in line with the catch targets for the season. If the catch target for the season is reached already during the season, the John Nurminen Foundation will make a separate decision on whether to pay for the catch that exceeds the target, and inform the fishermen who work for the project of the decision.

The phosphorus removal fee was paid if the following prerequisites were met:

1. The phosphorus removal fee is paid 1-2 times a year, based on an invoice and receipts delivered by the fishermen. In addition, the invoice must include an appendix with sales documentation for the catch that was delivered to food production, and a weighing certificate or other reliable document for the share of the catch not used in food production and delivered for further processing.
2. Reporting in line with instructions on the reporting form (e.g. fishing date, size of catch, share that is suitable for food production, fish released from the traps). Reports submitted to the project are public, and the information can be published on the project's website. However, personal information of the fishermen or information on the traps will not be published without a separate agreement.
3. Catch that qualifies for the phosphorus removal fee may not be left in piles on land or stored in a way that prevents its further use or processing in food production.
4. The phosphorus removal fee will be paid for the bream/roach catches fished during a time period that is separately defined with the fishermen (spring and autumn fishing). During this period, a trap may not be used for fishing anything else than a catch that meets the project's requirements.

Figure 4. Kala-Apu Oy's mincing machine separates the skin and bones from the fish. *Images: John Nurminen Foundation*

Production and delivery chains in the project

<u>1) Regional pilot in Turku and offering to institutional kitchens</u>

The delivery chain of the project's pilot phase was launched in cooperation with fish companies Kala-Apu Oy and Kalaliike S. Wallin from the Turku area. The City of Turku and the food services company Arkea were also involved in ensuring demand for the fish products in the early phases of the project. All project partners were committed to the project rules, which in practice meant that e.g. in production, minced bream fished in the project needed to be kept separately from mass made from other fish of the same area.

At launch in 2015, five fishermen from Turku and the nearby regions worked for the project. Kala-Apu Oy fetched the catch fished for the project directly from the fishermen, and minced the bream and roach. Kalaliike S. Wallin prepared the fish patties, developed in cooperation with Arkea, from the minced bream. In the early phases of the project, local fish patties were delivered to Arkea's food service points in Turku (schools, nursing homes, staff restaurants) and the food service points in Naantali, Paimio, and Salo. Local fish patties prepared by the local production chain were also available to consumers at the Kalaliike S. Wallin store at the Turku Market Hall. Delivering the local fish patties from Kalaliike S. Wallin to the customers had to be implemented outside the normally used institutional kitchen procurement and delivery channels, as the product could not, in spite of attempts, be featured on the lists of wholesalers during the project.

In the second year of the project, local fish patty deliveries were extended to cover the Helsinki metropolitan area through cooperation with Espoo Catering, Palmia Oy, and Lagerblad Foods. Espoo Catering served Kalaliike S. Wallin's local fish patty in staff restaurants, schools, and day care centres whenever there was a theme day involving the climate and sustainable development. The roach fish loaf, developed through the cooperation of Palmia and Lagerblad Foods, was featured in the six-week menu cycle of all of Palmia's 19 staff restaurants in the capital area.

"We made six different versions of roach. Palmia chose two, and by combining the recipes of these two, we arrived at the final product. The starting point was "Grandma's kitchen", the theme we received from Palmia. It was clear and easy to understand. There is no point in making a simple thing too complicated. And once people get around to tasting this, they realize this is really good."
- Timo Luotonen, Lagerblad Foods Oy, HS 22 May 2016 -

"Cyprinid patties are a good match with our values.
We want to serve domestic fish and locally produced food, so the choice is easy."
- Antti Mikkelä, Palmia HS 22 May 2016 -

Figure 5. Finnish media MTV3 found out more about the bream value chain in May 2015. In the images: Pekka Matikainen, managing director of Kala-Apu Oy, Hannu Lahtonen, fisherman, and Päivi Mäki-Petäjä, journalist from MTV3. *Images:John Nurminen Foundation*

2) Gradual expansion of operations and consumer products

In the second phase of the project, partnerships were expanded to secure the availability and reliable delivery of fish raw materials, and to be ready for growing demand. The goal was to expand both demand and supply in a controlled manner so that we could ensure all the fish caught in the project would go to further use, and no large quantities were lost to waste.

In order to increase the availability of fish raw materials, fishermen were recruited – in addition to the Archipelago Sea and its neighbouring areas – from the region of Uusikaarlepyy in the Bay of Bothnia, where a local manufacturing chain for utilizing the fish already existed. Brännskata Fiskare Oy in Vexala had begun the manufacture of bream mass already before the Local Fish project was launched, and existing delivery chains to customers, including the food services of the City of Helsinki, made a more flexible partnership possible, as the production of the minced bream in this value chain was not dependent solely on the demand within the project's delivery chain.

In the spring of 2017, a survey was conducted on the feasibility of expanding operations also in the eastern part of the Gulf of Finland. There was willingness to join amongst the fishermen of the area, and in the view of ESKO, the local fisheries action group of the area, the project was well worth pursuing, and there were also plans to launch pilot fishing experiments in the sea bays of the eastern Gulf of Finland. In terms of project operations, however, this expansion was deemed to be not feasible, as the area did not have the necessary stakeholders to take care of e.g. the handling and further processing of the catch, and the manufacture of minced fish. The logistics of transporting the fish to Southwest Finland was also problematic, as the extra cost of transportation would also have raised the price of the raw material. Furthermore, the capacity of the partner companies manufacturing minced bream would not have been enough to handle fish from elsewhere.

Marketing the local fish patty, developed with the cooperation of Kalaliike S. Wallin and Arkea, to municipalities of the coastal area was continued by contacting the parties responsible for purchasing and food services directly. Cooperation negotiations were underway also with Finnish Leijona Catering, but the price of the products turned out to be an obstacle for procurement on a large scale to take place.

In the autumn of 2016, to be able to introduce the bream consumer product to the market, the Foundation began discussions with Kesko. Via Kesko's own channels, Apetit Food Solutions was chosen as the manufacturer of the local fish product. As Kala-Apu Oy, the bream mass manufacturer in Turku, had closed operations in winter-spring 2017, a new manufacturer was urgently needed to join the value chain. After a quick survey and discussions, Kolvaan Kala Oy, which had already previously manufactured roach mass from the fish of Pyhäjärvi, Säkylä for Apetit, joined the project, and began manufacturing bream mass for the needs of the value chain. The first product, the Pirkka Archipelago fish patty, was prepared from bream and launched to consumers in April 2017, and the second version of the patty featuring spinach one year later in the spring of 2018; the latest product is the Pirkka Archipelago fish ball.

Figure 6. Archipelago fish products and Kalaliike S. Wallin's Local fish patty. *Images: Kesko & John Nurminen Foundation*

Side streams

As the goal of the project was to recycle the nutrients in the fish for further utilization, one aim was to also utilize the raw material side streams of the production chain, such as fish offal, in the food supply chain (for example as fodder for pigs or fish), or, alternatively, in energy production (biogas).

In Finland, a large share of the side streams of the fish industry is utilized as fodder at fur farms, which means that the side streams generate a small added value instead of just accruing costs. The Local Fish project primarily sought to find new utilization opportunities that add value for the side streams, and the rules of the project did in fact forbid directing side streams to fur farms. During the project, test batches of cyprinids and side streams were tried out to verify if they could be utilized in e.g. Baltic Sea fodder or as a raw material for pet foods. However, as the cyprinid raw material is low on fat, it has so far not turned out to be the best possible raw material for these purposes. The plans partner companies had for developing fodder for pigs were also not realized during the project.

The part of the catch that was not suitable for use in the food supply chain was already in the early phases of the project directed to biogas production at Sybimar Oy, a project partner involved already in the project's planning phase. The Foundation carried the costs for the offal delivered to the biogas plant (plant gate charges). Later, after fish mincing had moved from Turku to Säkylä, the side streams were handled in local biogas production. The side streams of fish mass produced in Ostrobothnia were utilized locally in biogas and to some extent also in biodiesel production. During the project, the local pet food manufacturer Mush tested whether bream could be used as raw material for dog food, but in this use as well, the low fat content of the fish was a challenge, and further product development is needed.

Workshops: Bottlenecks of commercialisation solved together with stakeholders of the fish industry

Two workshops (Fig. 7) were organised during the project, delving in particular on the bottlenecks of cyprinid value chains and the challenges of commercialization. A wide spectrum of participants was invited to the workshops, ranging from fish industry advocacy groups to fishermen, fish product manufacturers, and retailers.

The first workshop, “Cyprinids to dinner tables - Solving the bottlenecks of the value chain!", organised on 1 December 2015, sought to identify experiences and information on the existing challenges of the value chain, and on the key bottlenecks related to establishing new chains. The working group resulted in the formulation of both ideas and concrete measures and development targets that could be worked on to solve the bottlenecks.

Another workshop, “From subsidies to market-driven operations" on 8 June 2016 brought stakeholders together to ponder on operational models and measures that would boost the more efficient utilization of cyprinids. The workshop also had the objective of creating a solid base for launching cooperation with various stakeholders in order to implement the suggested solutions in practice. As a final outcome of the workshop, project and action proposals for the future were formulated, and the stakeholders, entities and partnerships required for their implementation identified.

Figure 7. Workshop ponders the key bottlenecks of the value chain. *Images: John Nurminen Foundation*

The fishermen of the project also provided feedback and development ideas for practical challenges that they felt were hampering the profitability of cyprinid fishing or the further utilization of the catch. The greatest bottlenecks turned out to be the practices related to fish collection, delays and the inability to move the catch forward in the chain due to mincing capacity, and the price paid for the fish. New solutions were also needed for the utilization of small-sized bream. Most helpful in solving these practical challenges would be improving the pick-up logistics and coordination of the catch, better estimates of fish demand at the various phases of the value chain, and, consequently, improved outlook to the likely demand for the catch.

Communications, marketing, and improving the image of cyprinids

Food production is one of the major sources of the nutrient load in the Baltic Sea and the Archipelago Sea. This is why one of the project's objectives was to increase consumer awareness of the connection between food production and water protection, at the same time improving the image of domestic fish as a food product: this was believed to have a positive impact on the demand for local fish products. The project's progress was communicated regularly, and it was actively marketed to various target groups, from fishermen to consumers. The project also received a lot of positive media visibility (Fig. 8).

Lihapullakone lykkää kalapihvejä

- Ostin koneen kalapihvien valmistusta varten aanelosen kokoisen, italiankielisen esitteen perusteella. Kun laite saapui, yllätyin siitä, miten pieni se on. Yllätys oli sekin, että se työntää ulos lihapullan mallisia pullia, eikä pihvin mallisia lättyjä, **Jaakko Manelius** Kalaliike S. Wallinilta nauraa.

Kalapihvit ovat osa viime keväänä alkanutta hanketta, jolla pienennetään Itämeren fosfori- ja typpikuormaa. John Nurmisen säätiön aloittama hanke hyödyntää vajaasti hyödynnettyä kalaa eli särkeä ja lahnaa.

- Tässä projektissa olemme saaneet tuotteistaa kaloja, ja nyt näistä tehty projektiin sopiva tuote, lähikalapihvi, hankkeessa mukana oleva kalastaja **Hannu Lahtonen** toteaa.

Manelius ja Lahtonen tekivät tuotekehitystä yhteistuumin Turun ruokapalveluyhtiö Arkean kanssa ennen kuin tuotanto saatiin kunnolla käyntiin tammikuussa.

Rannikkoseutu 1 April 2016

Säätiö alkaa maksaa särkien kalastuksesta

Saaristomeren särkikanta yritetään palauttaa luonnolliselle tasolleen. Arkistokuva.TS/Veikko Wahlroos

Lähialue | Turun Sanomat | 11.3.2015 14:27 | 7

Tuontikalan mussuttamiselle loppu särkikalojen pyynnillä

Ympäristö
12.2.2016, 19:34
Tekstin koko: A A A

Markku Vuorikari

Turkulainen Kala-Apu Oy jalostaa särkikaloista massaa elintarviketeollisuuden käyttöön. Lähikalapihvit ovat päässeet Turun seudun koulujen ja henkilöstöravintoloiden ruokalistoille.

John Nurmisen säätiön lähikalahanke etsii kalastajia. Tarkoitus on nostaa heikosti hyödynnettyä kalaa lautasille ja poistaa samalla ravinteita vesistöistä. Kansantalouskin kohenee syömällä lähikalaa.

Maaseudun Tulevaisuus 12 February 2016

Helsingin Sanomat, 22 May 2016

Figure 8. Project activities received a lot of interest in media.

To be able to recruit new fishers, the Local Fish project and roach and bream fishing – i.e. fishing of species that are widely deemed to be rough fish in the coastal areas – were marketed to fishermen in the annual info sessions organised e.g. in the Uusikaupunki area, in Naantali, Turku, Pori, and Uusikaarlepyy. Moreover, in 2016, the project was presented to fishermen in a seminar during the communications and "KALARI" training cruise organised by vocational school Livia (Fig. 9). The project was also actively in touch with the stakeholders of the value chain, looking for new partners and seeking to increase the demand for local fish products. After the pilot phase, direct person-to-person contacts were used to survey e.g. the willingness and possibilities of the coastal cities and municipalities to include local fish products in the food offering of their institutional kitchens; another survey of the municipalities was conducted in the late phases of the project in 2019.

The project's work, objectives, and results were communicated to stakeholders who are active in the areas of fishing and the utilization of underused fish in cooperation meetings, and by introducing the project at applicable events, such as the seminar 'Cyprinids and the circular economy' organised by the VAKAVA project in Jyväskylä in 2018, and the closing seminar of the Blue Products innovation project in Vaasa in 2019, as well as in the Foundation's own events. To the general public and consumers, the project's work and cyprinid delicacies were showcased at various public events, such as SuomiAreena in Pori in 2016 (Fig. 9), the Baltic Herring Fairs of Helsinki and Turku in 2017, and at the Helsinki International Boat Show.

(Kuvat: John Nurmisen Säätiö)

Figure 9. Representatives of the John Nurminen Foundation and the Local Fish project visit e.g. the stage of MTV3's SuomiAreena in Pori, and the KALARI training cruise. *Images: John Nurminen Foundation*

In cooperation with Palmia and Lagerblad Foods, the marketing video Särjen matka (the road of the roach), explaining the value chains of local fish products, was created during the project. A brochure, handed out to the Foundation's partners and at public events, was also created for the project. A poster presenting the project's activities called Elämää Itämeressä (life in the Baltic Sea), for use at school theme days and other similar events, was created in cooperation with the cities of Helsinki and Turku, the Baltic Sea Challenge, and Sealife Helsinki.

Financing

The preparations and launch of the project were completed in their entirety with the funds of the John Nurminen Foundation. In addition, the project was from March 2015 until the end of 2018 one of the pilot activities of the EU project NutriTrade, which was led by the Foundation (Fig. 10); partial funding from this project covered roughly 15% of the project's total cost of €500,000, in 2015–2019.

The project brochures, workshops in 2015 and 2016, and a share of the salary of the Foundation's project manager, amongst other things, were covered with EU Project funding. The Foundation's own funding covered in their entirety e.g. the phosphorus removal fees for the fishermen, monitoring of project rules, project expenses accrued from directing side streams to biogas plants, and the Foundation's project work in Ostrobothnia (Uusikaarlepyy region). A large share of the marketing materials were also created with funding from the Foundation and the project's partners. All project's cooperation partners participated using their own funding, spurred on by their motivation to turn the activities into a profitable business operation.

Figure 10. The NutriTrade project reached audiences from fishermen to international stakeholders.
Images: John Nurminen Foundation

Pilot within an EU Project

For three years, the Local Fishing project was a nutrient removal pilot in the **NutriTrade Project** (NutriTrade – Nutrient Offsetting for the Baltic Sea, 2015– 2018), led by the Foundation, and partially funded by the EU Interreg Central Baltic programme. The project developed innovative and cost-efficient measures that reduce the eutrophication of the Baltic Sea, and piloted a total of four new methods for reducing nutrients, both from the sea and on land, that cause eutrophication in the sea: cyprinid fishing, treating cultivated fields with gypsum, nutrient cycling, and mussel farming. The results of the NutriTrade project have been published on https://nutritradebaltic.eu/

NutriTrade
Nutrient Offsetting for the Baltic Sea
Interreg
Central Baltic
European Union
European Regional Development Fund
EU STRATEGY FOR THE BALTIC SEA REGION
FLAGSHIP

Research cooperation and following up the effects

There is very little research on the local impact of targeted cyprinid fishing on e.g. fish stocks of the coastal areas, or on other ecological consequences the operation might have, as the size of cyprinid stocks has been assessed only sporadically during other pilot projects implemented in the marine area (e.g. Jokinen & Reinikainen 2011, Setälä et.al. 2012), and the stocks of the fish species that have little commercial significance have not been regularly surveyed even by the fish stock monitoring of the Natural Resources Institute Finland.

Plans in Local Fish project included implementing an independent, scientific research subproject alongside the Local Fish project, and applications were made for its external funding. The objective of this subproject was to gain further information on the impact that targeted cyprinid fishing has on fish stocks, as well as on the other ecological impact mechanisms and consequences of the fishing operation. Financing for the research with the intended scope did not materialize, but the Natural Resources Institute Finland took samples also from the catches of the Local Fish project fishermen as part of their long-term monitoring, and in the autumn of 2019 published a report on the impact that strengthened fishing operations had on the roach and bream stocks of the Archipelago Sea (Lappalainen et. al. 2019).

Research into the factors that impact the food choices of consumers was also conducted during the project, in cooperation with the University of Helsinki and Palmia. The survey was conducted with a questionnaire at Palmia's 19 lunch restaurants in the autumn of 2016. Different restaurants randomly displayed four different info signs on the roach patties that were available for lunch (Fig. 11), and all customers were asked to fill in a questionnaire on their choice of dish. The total number of usable answers from all restaurants was 1,406. The survey discovered that the most often cited reason for the selection was that the food was local, whereas the fact that the dish was friendly to the Baltic Sea or the environment did not, on its own, seem to have a great impact on the choice. The research results have been published in the journal Organization & Environment.*

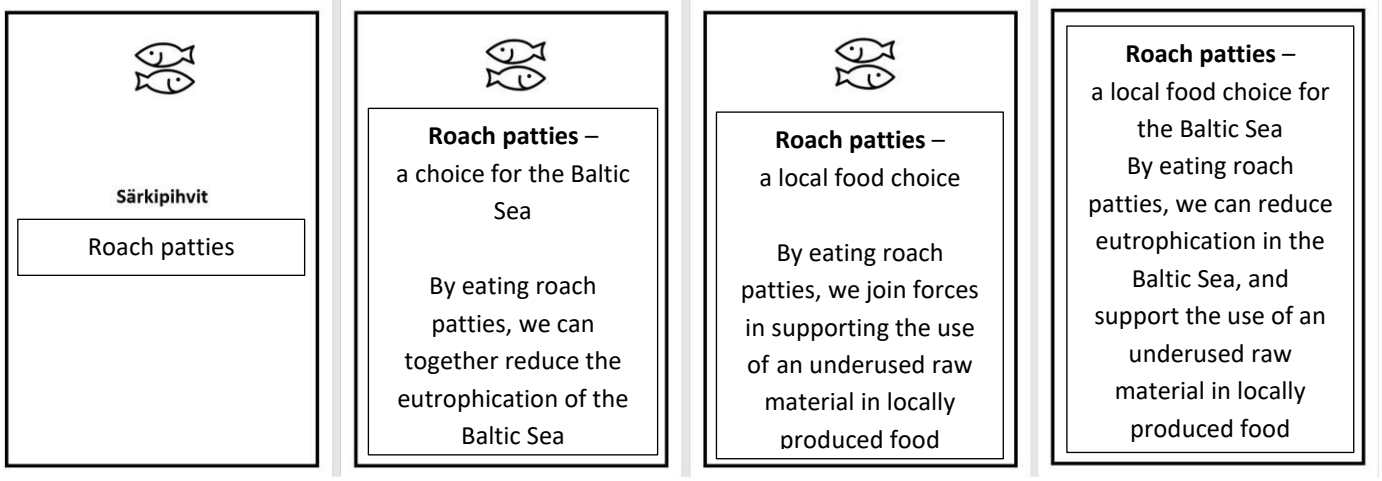

Figure 11. The roach patty that was one of the lunch options was presented in different ways to the customers of the various restaurants.

* Salmivaara & Lankoski 2019: Promoting Sustainable Consumer Behaviour Through the Activation of Injunctive Social Norms: A Field Experiment in 19 Workplace Restaurants. https://researchportal.helsinki.fi/en/publications/promoting-sustainable-consumer-behaviour-through-the-activation-o

Results

The John Nurminen Foundation's Local Fish project created, for the first time in Finland, a commercially viable and market-driven value chain for the cyprinids of the Archipelago Sea, bringing them from the sea to our dinner tables. At the same time, the image of bream and roach as a food fish was significantly improved. The project fished almost 700 tons of bream and roach from the Archipelago and Bothnian Seas, and, with the fish catch, removed approximately 5 tons of eutrophication-inducing phosphorus from the Sea. In addition to the success stories, the project identified concrete development needs in the value chains of cyprinid commercialization.

Key results and success stories

Through fishing of cyprinids, the Local Fish project removed five tons of phosphorus from the Baltic Sea; created a market-driven value chain for cyprinids from the sea to our plates; and improved the image of cyprinids as food fish. In addition, in 2018, the Local Fishing project won the ELO Foundation's Flying Saucer award for food culture.

During the project, a total of five products were launched for institutional kitchens and consumers: the Local Fish patty (Arkea & Kalaliike S. Wallin), the roach loaf patty (Palmia & Lagerblad Foods), and three Archipelago Fish products for Kesko's Pirkka range (manufactured by Apetit). In the Local Fishing project, the Foundation and the project's partners were trailblazers: during the project, the number of cyprinid consumer products created also outside the project has grown significantly (Fig. 12). At the same time, new delivery chains have opened up for the fishermen's catches, and demand for roach and bream as raw materials for food products has grown.

Consumers' awareness of the benefits of eating cyprinids has also grown during the project. By disseminating information, marketing, and engaging in cooperation with many different stakeholders, the Local Fish project was able to create the conditions for a permanent domestic market for products made of Baltic Sea bream and roach. Based on received feedback, communications and cooperation within the project and its planning phase were successful. While active, the project was supported by key stakeholder groups, and, with transparent cooperation, a sustainable operating environment was created in a playing field that used to be burdened with strife. The project received positive publicity, and managed to raise the image of Finnish cyprinids.

Figure 12. Examples of retail products made of bream and roach. *Images: Manufacturers of the products*

Figure 13. Archipelago Fish products showcased at the Food for Media fair on 26 April 2017.
Images: John Nurminen Foundation

Identified challenges and development needs

During the project we could see that there is a demand for products made of cyprinids if the price is right, and that this demand can be met when all the pieces of the value chain work together in a coordinated manner. However, tackling the challenges and uncertainties identified in the value chain will still require technical development and investments, and closer cooperation between the fishermen, other primary producers of the fishery industry, fish processers, and retail stakeholders. Solutions to these developments needs need to be identified to be able to increase the volume and profitability of fishing in the future.

The project demonstrated in practice how vulnerable the chains built on small, individual stakeholders can be. We ran into difficulties e.g. in the spring of 2017, when Kala-Apu Oy, the company who had produced the minced fish in the first phase of the project discontinued its operations; at a critical moment, when the packaging of the new retail products was already being printed and production and spring fishing were about to commence, the chain was left hanging in the air. To be able to find a new mincing partner in time, the Foundation had to use all the contacts it had created during the project. After quick negotiations, and not a moment too soon, Kolvaan Kala Oy replaced Kala-Apu in the production chain. Even later in the project, the Foundation took on the role of intermediator between the stakeholders, even promising to act as a financial buffer and intermediary buyer of the fish mince already prepared and waiting in the freezers should the demand for the mince fail to correspond adequately to the estimates made when launching the consumer products. If orders for raw materials and products had been made beforehand and in good time, this would have evened out the financial insecurity related to product demand, which in the existing value chains is often left to the smaller stakeholders of the chain's early stages, such as fishermen and the first buyers of fish, to bear.

The relatively small stakeholders of the early stages of the value chain also bear considerable financial risk as they are positioned to be a buffer between fish demand and supply, and the demand for the end product. Fishermen and small-sized producers should in fact not be left to bear the risks linked to fish availability and product demand alone: what is needed is flexibility and foresight also on behalf of the larger stakeholders of the chain, who could make forecasts of needed raw material volumes based on demand estimates, and place orders in time – even before the spring fishing season commences, allowing the first buyers of fish and the fishermen to make estimates on the demand for fish on a solid basis, and plan their operations accordingly. For coastal cyprinids, the short spring fishing season increases the need to make estimates available early, as the raw material for a full year's supply of retail products is fished in April-June. Developing the winter fishing of cyprinids further might help a bit in levelling out the fishing seasons.

When the project was already over in 2020, Kolvaan Kala Oy also decided to discontinue bream mass production for profitability and capacity reasons, and to focus its operations on roach fished from the lakes of the area. Production chain stakeholders were not immediately aware of any bream mince suppliers who could take on the work, and new partners are not always easy to find via the existing producer contact networks, which is why we need more cooperation, exchange of information, and operational coordination amongst the various stakeholders, ranging from processors and local fishery operators to the fishermen, to solve the challenges and to ensure the continuity of the value chain. Moreover, increasing the cooperation of fishermen and small-scale producers to build more centralized operations would improve profitability in the first links of the chain.

Concerning products for industrial kitchens, the project had to conclude that marketing products to them was difficult if the product was not readily available at wholesalers. Those in charge of purchasing felt that building separate procurement and logistics chains was too much of a challenge, even if they supported the goals of the project and were interested in the product. The project wished to maintain the fish content of the industrial kitchen products at a high level (even 90%), which meant the price of the product was higher compared to other products in the same category. During the project, negotiations on manufacturing the products were carried out with some larger manufacturers and wholesalers, but the price of the end product, which was assessed to be too high, became a barrier to the stakeholders' willingness to manufacture higher volume cyprinid products. Municipal procurement budgets were also extremely tight during the project, and many municipalities did not see that including a specific, more expensive product in their offering was possible on a regular basis.

On the other hand, there were municipalities where the price was not a problem, as they were able to compensate the higher price of an individual product by choosing other products from a less costly category. According to the new questionnaire and marketing round completed in 2019, both the willingness and financial flexibility required to procure local fish products had grown in coastal municipalities, but the availability of the products at wholesalers remained a problem that could be not solved during the project.

Conclusions and key learnings

Time was right for launching the project: In the 2010s, with the growing trend of vegetarian and local food and the rising market price of Norwegian salmon, consumers were ready for new kinds of choices: this was key to the success of the project, as growing demand was the most important prerequisite of the products' success. During the project, other cyprinid products and producers entered the market: in the future, however, success will be defined by the effort put into removing bottlenecks in the value chain, and also by outside factors. Nevertheless, the project proved that commercializing the fish stock management of cyprinids was far from impossible!

Development ideas and feedback from project partners

During and at the end of the project experiences and feedback were gathered from the fishermen who participated in the project, as well as other partners and stakeholders. In the spring of 2020, at project closure, the workshop that had been planned for the purpose of collecting feedback and development needs had to be cancelled due to the restrictions caused by the Covid-19 pandemic; instead of the workshop, feedback was gathered by interviewing partners and other stakeholders on what their experience of working with the project had been like, and what they felt were the key development needs from the perspectives of different stakeholders (Fig. 14 and 15, appendix 3). The interviews were conducted by Capgemini Finland Oy, as pro bono work for the Foundation.

In addition to the experiences collected by the John Nurminen Foundation, the Local Fish project received a lot of feedback from various stakeholders, ranging from the planning phase of the project all the way up to the publishing of its final report. Most of the feedback received during the Project's five-year lifespan has been positive and encouraging, with most prejudice shown towards the project from inside the fishing industry. In previous years and decades, there had been many efforts to improve the sales of less-valued fish, and as these had not turned out to be profitable, the field was rife with strong views and opinions that did not really encourage anyone to try again.

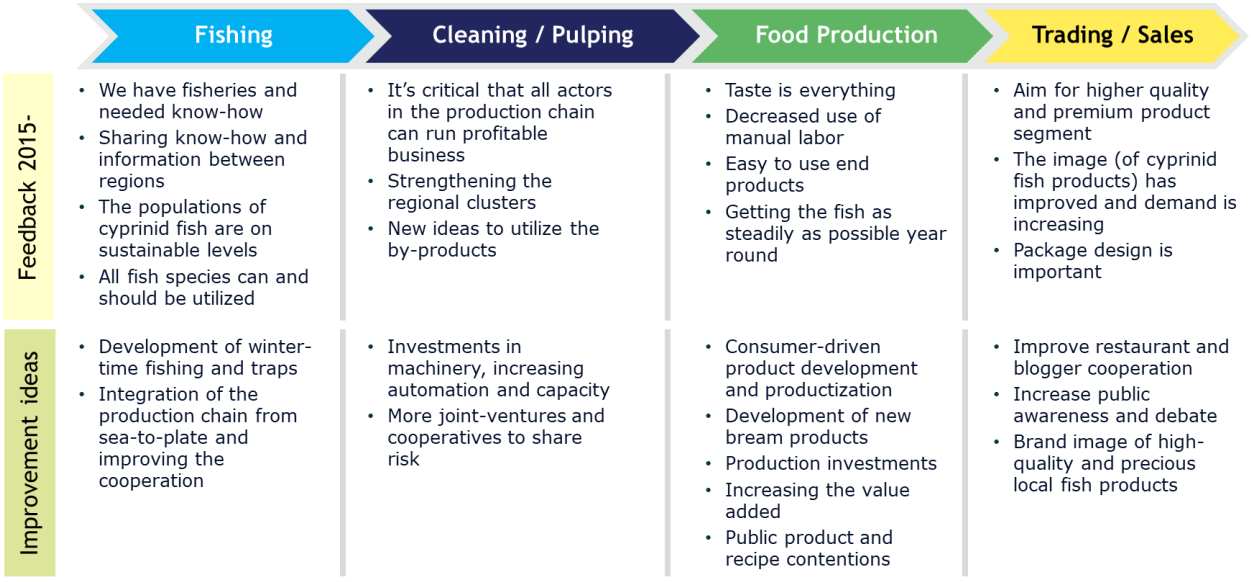

Figure 14. How can we achieve a status where cyprinids are utilized in an economically sustainable way, reducing the nutrient load of the Baltic Sea? Key results from stakeholder group interviews (spring 2020, Capgemini Finland Oy)

As expected, the sharpest criticisms targeted the sustainable fishing rules that were used during the project – this criticism, however, mostly originated outside the project, and the contract fishermen who had volunteered for the project and committed to the rules did not, for the most part, see them as too inconvenient; they understood both the need for rules in a sustainable fish stock management project, and the fact that they enabled all project participants to focus on their core tasks. Combined with open communications, the rules for sustainable fish stock management were also the solid basis on which the success of Local Fish product marketing was built. When marketing products for consumers, retail stakeholders felt that sustainable fishing was a key argument.

Project partners felt that the media visibility of the project and the introduction of cyprinids as a food fish in the news were positive developments also in the larger scheme of things, not just as promotion for the Local Fish project. It was important that through the work of the Foundation and the project, the image of cyprinids changed from trash fish to a valuable and environmentally friendly local food; this new image will hopefully help promote the products also in the future.

The interviews conducted in the spring of 2020 focused on improving the profitability in the early phases of the value chain, increasing cooperation between the various stakeholders in the chain, and developing and maintaining a strong image for domestic, high-quality local fish. Investments in fish processing, particularly in more efficient sorting and gutting, are needed in order to improve profitability. Also receiving and handling the catch at larger, regional units would improve profitability in primary production, and also be at least a partial solution for improving logistics coordination, as called for by the fishermen. Increasing profitability at every phase of the chain is key to the continuity of the value chains, as is ensuring that the price levels of the products remain competitive both in retail and from the viewpoint of industrial customers.

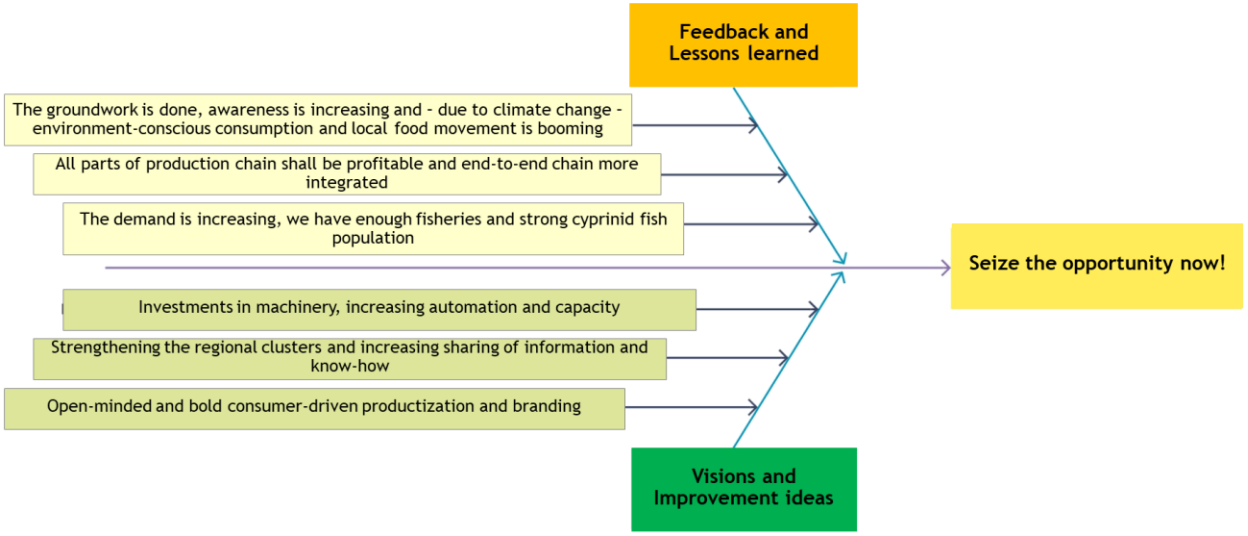

Figure 15. The time for growth is right – now! Key results from stakeholder group interviews (spring 2020, Capgemini Finland Oy

Future outlook & new fish streams

As the Local Fish project drew to a close in the end of 2019, the consumer markets offered – in addition to the Pirkka Archipelago fish products – several other domestic bream or roach products, such as the JärkiSärki preserves, Särvin fish mince (Särkifood), and Apetit Järvikala products.
In early 2020, Pielisen Kalajaloste launched their Luonnonkala preserve, featuring a selection of cyprinids (e.g. bream, ide, and white bream): in 2020, its sales in stores had already surpassed the availability of raw material from the local lake district, providing opportunities also for the use of the cyprinid catches from the coastal areas.

Also industrial kitchen procurement, for example in municipalities, displayed growing interest towards domestic fish products, as their procurement increasingly strives to focus on ecological and local food. In this sector, in fact, there would be potential for new cyprinid and Baltic herring products if they would only be available via traditional procurement channels, such as HoReCa wholesalers. Leijona Catering, for example, would have been happy to feature domestic local fish products in their offering, but as their distribution volumes are high, the price of the product turned out to be an obstacle, at least for the time being.

The domestic pet food industry in Finland has been increasingly interested in using domestic fish raw materials in their dog and cat foods. In this sector too, the potential for utilizing cyprinid resources is great, as long as pet food product development moves forward, and the logistics and cold chains are fully operational.

The Blue Products innovation programme has developed and designed new ways to use and create added value products from less-valued fish, focusing primarily on the Baltic herring, but some of their ideas are potentially also applicable to cyprinids. During the past few years, several projects have also been launched to promote cyprinid and fish stock management commercialization in inland waters, and we should hope that the methods, means, and key learnings, developed through the cooperation of stakeholders in all projects, can be shared and taken up in practice as extensively as possible.

Figure 16. To meet growing demand, the uncertainties and development needs of the early phases of the value chain need to be tackled also in the future. *Images: John Nurminen Foundation*

Recipe for success?

The Local Fishing project tackled the commercialization of coastal cyprinid management fishing when the time was right to do so, but there was also a lot of work and commitment to common goals behind this success story. One key element was that all project partners participated using their own funding, spurred on by their motivation to turn the activities into a profitable business operation. Even though the phosphorus removal fee was an incentive to the project fishermen, they too saw the project as an opportunity to expand fishing to new species, thus improving the profitability of their livelihood. None of the project participants, at any phase of the project, were motivated to participate only for the project's sake, but sought to create something permanent.

The John Nurminen Foundation was successful in creating a trusting collaborative working relationship with the fishermen, partners, and other key stakeholder groups alike. The fish stock management rules, drawn up by the project, and the entire cooperative process that was active in the background, making functional compromises possible, have been the basis for the project's results, and also for the creation of an environmentally friendly and sustainable image for domestic consumer products made of cyprinids. Targeted cyprinid fishing that is ecologically, socially and financially sustainable was proven possible, when there is sufficient trust between the stakeholders, the goals and the rules of the game are clear and transparent to all, and information flows between stakeholders are unencumbered. Retail stakeholders focus more and more on sustainability in their fish selections, and prefer e.g. MSC-certified fish. In the best-case scenario, the operational principles of sustainable domestic fishing could accelerate the demand for domestic fish further, and be a way to disseminate information on sustainable produce that provides full coverage of the consumer market, but has less bureaucracy and is a cheaper alternative, particularly for smaller stakeholders, of pricey MSC certification.

As a stakeholder from outside the fishing industry, the Foundation was able to be a communicator and mediator in the commercial value chains, operating in a way that was a departure from established models. The Foundation sought, to the best of its ability, to promote the creation of a new kind of cooperation between various stakeholders at different phases of the value chain, thus building greater understanding of the operations of the entire chain amongst the stakeholders, both from the viewpoints of individual players and of the chain in its entirety. Understanding the operations of the entire chain and increasing cooperation both amongst the fishermen and amongst other stakeholders is the key to find solutions to at least some of the key bottlenecks. In terms of future operational models, it is important that all stakeholders, whether they are selling the fish or need it as a raw material, would learn to be more brave and open in contacting one another directly, and joining forces to improve the efficiency of their operations.

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Appendices

1) Rules of the Local Fishing project
2) Local Fishing project call for applications and application form for fishermen (2019)
3) Results of the closing interview (Capgemini Finland Oy), spring 2020

Appendix 1: Rules of the Local Fishing project

22.1.2019

CALL FOR CONTRACT FISHERMEN

FOR THE JOHN NURMINEN FOUNDATION'S LOCAL FISHING PROJECT IN 2019

The John Nurminen Foundation is looking for contract fishermen for the Local Fishing Project. 10 to 15 fishermen can be chosen for the year 2019. **The call opens on Tuesday 22 January 2019 and closes on Friday 22 February 2019.** Fishermen of a particular area can also file a joint application as a group.

You can apply by either filling an application template, or by drawing up a free-form application which should, however, itemize clearly the information mentioned in the project's selection criteria. The application should also include an estimate of an average-sized catch that the fisherman/group of fishermen could fish for the project during 2019. The total target for 2019 is 200-250,000 kg of bream (>500 g) and roach (>70 g), which should comprise a minimum of 70% of an average catch fished for the project.

When necessary, the Foundation can request more specific information to be included in the application. Applications that do not include all the information required in the project's selection criteria cannot be considered for selection. If no applications that fulfil the selection criteria are submitted by the end of the application period, the Foundation reserves the right to open the call again, or to select no fishermen for the project for the year 2019.

Applications should be delivered in writing to the John Nurminen Foundation:

Via e-mail: **miina.maki (at) jnfoundation.fi** with the heading LOCAL FISHING PROJECT

Via mail:
APPLICATION – LOCAL FISHING PROJECT
Miina Mäki, Project Manager
John Nurminen Foundation
Pasilankatu 2
FI-00240 HELSINKI

SELECTION CRITERIA

Each application must include the following information, which will be considered in fishermen selection:

1. Experience in fyke net fishing of cyprinids (duration of fishing activity, and percentage of cyprinids in the catch, on average).
2. Estimate: total catch for a season, average catch/trap, fish species (roach/bream/other)
3. Estimate: percentage of fish in the cyprinid catch that are suitable for use in food production (e.g. fish mincing)
4. Trap locations: existing trap sites, fishing rights and permits (attach a map appendix with trap locations marked, including the GPS coordinates of the locations) NB! See rules of the project.
5. Fisherman's ability to deliver the catch into a harbour where further processing is possible and where the buyer can pick up the catch (fishermen agree on delivery sites themselves with the buyers).
6. Participation in the project in earlier year

THE JOHN NURMINEN FOUNDATION LOCAL FISHING PROJECT

The objective of the John Nurminen Foundation Local Fishing Project is to recycle nutrients from a marine ecosystem to land, and, at the same time, support discharge reduction measures that improve the status of the coastal waters. Moreover, the goal is to improve the use of cyprinids for human consumption, and to monitor the impact of fishing particularly on the wellbeing of the Archipelago Sea. The project will focus on targeted fishing of underused cyprinids, and limit values set for fishing ensure that the activities are in line with the values of sustainable development. The catch of cyprinids will be utilised in its entirety: most will be processed further for use in the food industry, with unused fish parts used either as fish fodder or in energy production. Contract fishermen for the project will be selected through an open call. In exchange for the phosphorus removal fee paid by the project, participating fishermen commit to the requirements defined by the project. **The phosphorus removal fee pertains only to the catch of cyprinids.**

Participating contract fishermen are selected for one year at a time, and in 2019, the phosphorus removal fee will be paid for cyprinid catches to the fishermen in adherence to the following requirements:

1. The objective is to remove nutrients from the sea by fishing cyprinids, and to direct as large a share of the fished cyprinids as possible, i.e. a minimum of 70% of the average catch, for use in food production.
2. The catch is primarily delivered to the project's partners, who pay a market price for the share of the catch that fulfils quality criteria and will be used in food production. The fishermen conclude agreements on the sale and delivery of the catch themselves, working directly with the buyers.
3. In 2019, the phosphorus removal fee is €0.531/kg of fished cyprinids. The basis of the fee is a compensation of €66.37 for each kg of phosphorus removed from the sea
4. The phosphorus removal fee can be paid for a catch that corresponds to the catch targets for the 2019 season. If the catch target for the 2019 season is reached already during the season, the John Nurminen Foundation will make a separate decision on whether to pay for the catch that exceeds the target, and inform the fishermen who work for the project of the decision.

Prerequisites for the phosphorus removal fee:

1. The phosphorus removal fee is paid 1-2 times a year, based on an invoice and receipts delivered by the fishermen. In addition, the invoice must include an appendix with sales documentation for the catch that was delivered to food production, and a weighing certificate or another reliable document for the share of the catch not used for human consumption and delivered for further processing.

2. Reporting in line with instructions on the reporting form (e.g. date, size of catch, share that is suitable for food production, fish released from the traps). Reports submitted to the project are public, and the information can be published on the Project's website. However, personal information of the fishermen or information on the traps will not be published without a separate agreement.

3. Catch that qualifies for the phosphorus removal fee may not be left in piles on land or stored in a way that prevents its further use or processing in food production.

4. The phosphorus removal fee will be paid for the bream/roach catches fished during a time period that is separately defined with the fishermen (spring and autumn fishing). During this period, the same trap may not be used for fishing anything else than catch that meets the project's requirements.

The phosphorus removal fee, paid by the project for cyprinid catches, is subject to conditions and can be reclaimed. By signing the project agreement with the John Nurminen Foundation, fishermen participating in the project commit to the fishing requirements set out in the project rules below:

Rules of the project:

1. Traps and trap placement

1.1. The fish are fished with traps that allow the unwanted side catch defined in section 2.1 to be released alive and unharmed.
1.2. Traps used in the project are marked with project identifiers during the period they are used for project fishing.
1.3. Fishing may not take place on the routes of migratory fish or at mouths of rivers. The Project must approve trap placement in advance.
1.4. Fishing will not take place in protected areas.
1.5. A written consent for the traps is obtained from the water area's owner/shareholders.

2. Catch and catch handling

2.1. All fish species classified as threatened or endangered, undersized fish, and the predatory fish listed below are released unharmed (for example using a hand net when checking a trap) from the traps that are used in the project:
- Species marked with red or orange in the WWF fishing guide are considered to be threatened or endangered: Eel, salmon, trout, grayling, whitefish
- Other species to be released: Perch over 35 cm, pike, pike-perch, burbot, lamprey, asp, cod, flounders

2.2. Permitted side catch:
- Mixed catch of cyprinids and smelt. Background: Smelt is also an underused species that has grown more voluminous in recent times. In the spring time, catch from fyke nets can comprise both cyprinids and smelt.
- Perch, under 35 cm - allowed share of side catch max 25% of the catch in the trap.
- Baltic herring – when a school of Baltic herring is discovered in a cyprinid fyke net, the Baltic herrings must be either released or separated from the other catch and reported to the authorities, in line with normal fishing quota practices. The main purpose of the trap may not, however, be Baltic herring fishing.
- Other species randomly found in the catch that are not mentioned in Section 2.1, when their share is not above 10% of the catch in the trap.

NB: Side catch is not eligible for the phosphorus removal fee.

2.3. The cyprinid catch is taken up in its entirety.
2.4. The objective is to deliver as large a share of the cyprinid catch as possible for human consumption, and the catch delivered for use in food production must fulfil the quality requirements of foodstuffs manufacturing (e.g. bream bleeding, cold chain). Receipts for the sale of the catch must be provided (e.g. receipt from buyer).
2.5. A catch of cyprinids or a part of the catch may not be delivered as fodder to fur farming.

2.6. Catch that is eligible for the project's phosphorus removal fee may not at the same time receive any other type of fishing subsidy.
2.7. At any one time, only the catch from traps included in the project may be delivered to receiving harbours (may not be mixed with catch from other traps).
2.8. When so required, the fisherman will take samples of the catch for the research institutions that participate in the research part of the project, or allow a researcher join them in checking traps and/or taking samples (a separate compensation is paid for research samples)

3. Oversight

3.1. The project has the right to monitor that project rules are followed at fishing harbours and at traps. When so required, fishermen are obliged to take a project supervisor/representative with them to the traps.
3.2. Fishermen will document their catches, both for catch that is taken up and for catch that is released. In addition, the project will be notified of included traps and their locations. The catch documentation is public information for both the catch taken up and the fish that were released. Catch information is made public on the Project's Internet pages with the exception of the personal data of the fishermen and trap locations, which will not be made public without separate agreement.
3.3. When project rules are breached (e.g. reporting is insufficient), such cases are always handled jointly by the project and the fisherman, and the consequence for an intentional breach will be the immediate discontinuation of the payment of the phosphorus removal fee, and, if necessary, return of fees already paid.

<u>In addition to the Rules, the project will adhere to the following operational principles:</u>

- Random and sporadic erroneous catches amongst other catch do not as such lead to the immediate discontinuation of the subsidy.
- Sporadic erroneous catches will also be reported in connection with other reports, and the Foundation withholds the right to, if necessary, estimate when the errors are considered to be sporadic, and to decide what the consequences, if any, and next actions will be, in line with its assessment.
- Species that are discovered dead in the traps, and defined to be released in the Rules, must be returned to water.

Appendix 2: Application form for fishermen

APPLICATION	**THE JOHN NURMINEN FOUNDATION LOCAL FISHING PROJECT 2019**	
1. Applicant data	**Name**	**Business ID**
	Postal address	**E-mail address**
	Telephone number	**Fishing area**
2. Fishing information	**Experience in trap fishing of cyprinids / participation in the project in previous years** (duration of fishing activity, percentage of cyprinids in the catch, on average).	
	Estimate of total catch for the season, kg	**Estimate of catch/trap, kg**
	Fished species (roach/bream/other)	**Estimate of the share of fish catch that is suitable for food production** (%)
	Number and location of traps (marine area, gps coordinates of the locations)	
	Delivering the catch for further processing; delivery harbour and partners, if any (fishermen agree themselves and beforehand with the buyers where the catch is to be picked up)	
Date	**Applicant's signature**	

Mandatory appendices: **1) documents on right to fish, and permits from the owner of the water area**
2) map appendix with trap locations marked

Appendix 3: Results of the closing interview (Capgemini Finland Oy, spring 2020)

We collected feedback from the Local Fishing Project

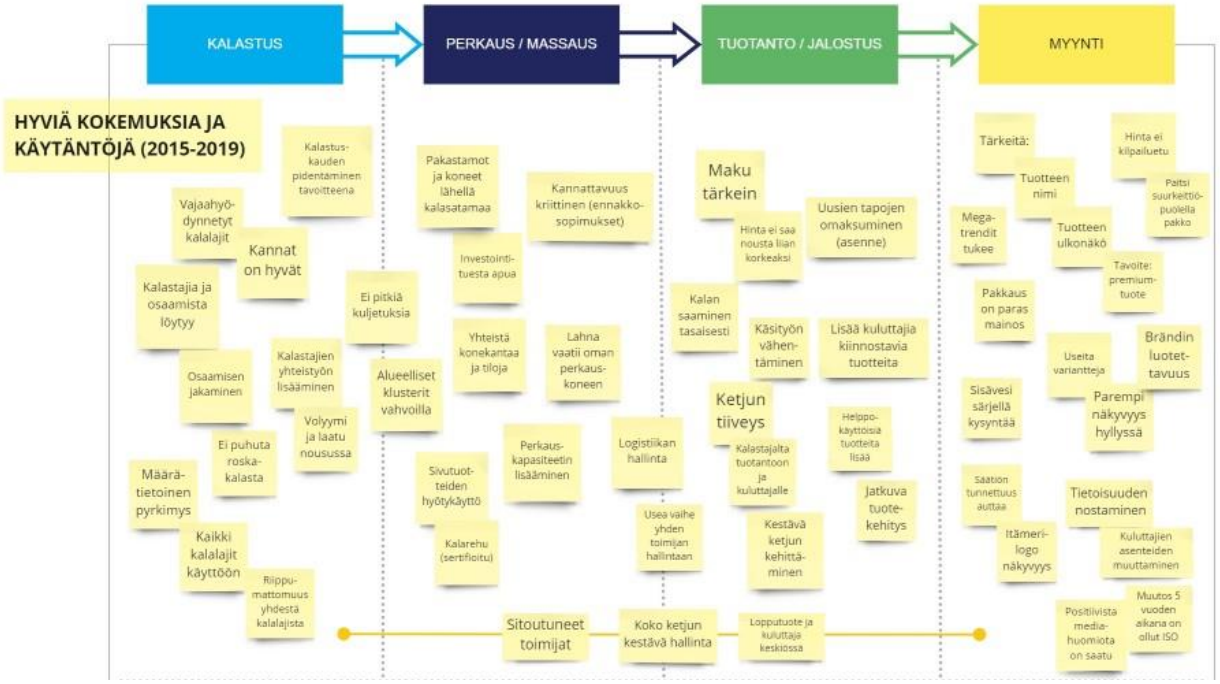
We gathered feedback and improvement ideas from the Local Fishing Project by intreviewing cooperation partners representing different phases of the production chain. Interviews were done by phone in February-April 2020.

We inteviewed following cooperation partners:

- **The Fishery Groups within Bothnian Sea and Lake Pyhäjärvi**, Fishery Counsel Mika Halttu
- **Kolvaan Kala Oy** (fish cleaning and pulping company) Jouni Aaltonen
- **JärkiSärki** (company producing own roach product) Marja Komppa
- **Särkifood** (company producing of own roach product using fish pulp) Paavo Vallas
- **Apetit Ruoka Oy** (major finnish food industry company), Sales Manager
- **Kesko Oy** (Leading Finnish Retail Company,) Product Manager
- **LagerbladFoods** (company producing cyprinid fish products to institutional kitchens) Timo Luotonen, Sales
- **Fisheries Group of Central Finland**, Fishing Industry Activator Janne Ruokolainen
- **Koillismaan Luonnonkala Oy** (company producing own fresh-water fish products in North-East Finland) Juha Korhonen
- **Ministry of Agriculture and Forestry of Finland**, Ministerial Adviser Timo Halonen

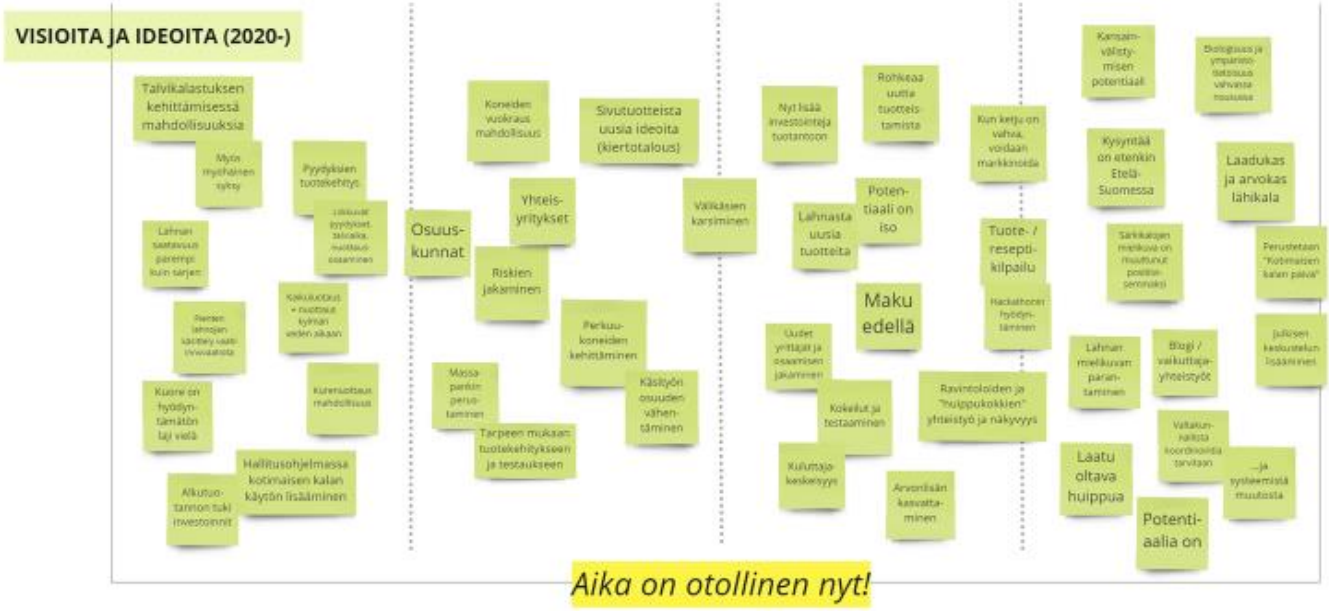
The interviews gave us valuable insights...

Documentation of the interviews in Finnish (feedback and best practices from 2015 -2019)



...as well as lots of improvement ideas for the future

Documentation of the interviews in Finnish (visions and improvement ideas 2020 and beyond)



Local Fishing Project received a lot of positive feedback

Summary of the key findings

	Fishing	Cleaning / Pulping	Food Production	Trading / Sales
Feedback 2015 -	• We have fisheries and needed know-how • Sharing know-how and information between regions • The populations of cyprinid fish are on sustainable levels • All fish species can and should be utilized	• It's critical that all actors in the production chain can run profitable business • Strengthening the regional clusters • New ideas to utilize the by-products	• Taste is everything • Decreased use of manual labor • Easy to use end products • Getting the fish as steadily as possible year-round	• Aim for higher quality and premium product segment • The image (of cyprinid fish products) has improved and demand is increasing • Package design is important
Improvement ideas	• Development of winter time fishing and traps • Integration of the production chain from sea-to-plate and improving the cooperation	• Investments in machinery, increasing automation and capacity • More joint-ventures and cooperatives to share risk	• Consumer-driven product development and productization • Development of new bream products • Production investments • Increasing the value added • Public product and recipe contentions	• Improve restaurant and blogger cooperation • Increase public awareness and debate • Brand image of high-quality and precious local fish products

The opportunity is there and the right time to act is - now!

How do we achieve financially sustainable model for solidifying Baltic Sea cyprinid fish as part of the food chain?