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PHOTO: KRISTJÁN MAACK

Too much fish goes to waste

Imperative to stop wasting resources

Sigrún Erna Geirsdóttir

One of the main current global challenges is to ensure sufficient food supply for coming generations. The pressing issue stems from the population continuing to rise and supply of food not keeping up with the growing number of people. An efficient management of food sources, such as seafood, is necessary, as it is a rich part of people's diet. Presently, however, a considerable amount of seafood goes to waste when it could be used for valuablebi-products.

Finite resource

Fish is a key component of people´s food, and technical advances in logistics and processing makes fish available anywhere in the world, regardless of location. China is one of the largest fish consumers and the Chinese fisheries sector is the largest in the world. Among other significant fishing nations are e.g. Peru, Japan, United States, Chile, Indonesia and Russia.

Usually fish is caught within a 200 mile jurisdiction, where fish is most commonly available, but these areas are ecologically sensitive as well. Since fish stocks are not an infinite resource, catching has become regulated through quotas, in an effort to prevent depleting the stocks. Results have been mixed. It is estimated that in the ocean from North-America to the British Isles, some fish stocks have decreased by 90% from peak condition. Cod is believed to been hit the worst. Herring has decreased significantly as well, and since herring is feed for a number of species, the herring reduction has further escalated effects of fishing on cod stocks. In a large research, published by Science in 2006, it is concluded that a third of all

Discards are a serious issue in itself and it is estimated that up to 20% of all catch in the US is being discarded.

fish stocks were currently within 10% of previously measured peak conditions. Fish stocks have in effect experienced a complete collapse. Based on the research, it was predicted that within 50 years, all fish stocks would collapse, if no action was taken. Even if this development would be reversed, fishing would not meet the demand for fish. In this light, aquaculture has been seen as a future possibility. Today, about a third of all seafood consumed in the United States comes from aquaculture.

A great waste of value

It is a priority to respond to waste of fish and increase the utilization of each fish. The waste of valuable raw material is a grave matter. In a recent report by environmental organization Oceana called Wasted Cash, it is concluded that US fisheries could be missing out on up to a billion dollars in annual revenue due to the kind of waste being thrown out. Among the discarded material are bones, entrails, heads and fish skin, which are all usable materials. Discards are a serious issue in itself and it is estimated that up to 20% of all catch in the US is being discarded. In addition, processing plants discard even more, perhaps a greater proportion of the fish is being discarded than processed. A research from 2006 by Science, states that one of the greatest threats to all fish species in the ocean, are bad processing methods in the seafood industry. According to a biologist interviewed in the research, a complete collapse in all fish stocks will happen before 2048, if no drastic measures were taken.

Success in utilization

As fish is processed, there are portions of the fish that usually get discarded, portions which more often than not, can be used to produce valuable products. Examples of such products include fish oil, fish meal, fuel, bait, fertilizers, pet food, health food and dietary supplements. In few places, the utilization of each individual fish has reached as successful levels as in Iceland. A good example of this is Codland, which produces collagen from fish skin and further plans to include bones and entrails for its products. Another good example of creating value from traditional waste is Haustak which dries fish and processes different products, including dried fish heads. These products have created great value to the companies and in the process, it has become clear that greater utilization of catch, hides ample opportunities in plain sight, to create value from perceived waste.

Drying container for fish processors

Decreases waste and increases product range

Páll Gíslason, director of Ocean Excellence.

Different roads have been travelled to further use each part of the fish during processing, such as filtering liquids and drying fish parts. By filtering liquids it is possible to capture protein and enzymes, and parts of the fish have been used for dried heads and fish meal. Icelanders have long been at the forefront of utilizing the catch, as stockfish, fish meal and dried fishheads bear witness to.

Continuous development

Haustak is a company specializing in dried products and sells most of its production, mainly heads, to Nigeria. The company's drying facility is a state of the art, technologically advanced factory. It uses latest techniques for ventilation and heat pumps to dispense heat into the drying process. The factory is automated to an extent, using robots for different tasks. Recently, Ocean Excellence developed a mobile drying unit, mounted in a standard insulated container unit. The project was a joint effort by Haustak, Samey and Mannvit. Marketing and sales of the drying container is led by Ocean Excellence which specializes in sales of Icelandic technology for the seafood industry to smaller producers outside of Iceland. "The design work on the drying container has been ongoing for some time and it was finished in the beginning of the summer," says Páll Gíslason, director of Ocean Excellence. A small prototype of the drying container is currently being used for testing by Samey to log and research optimal temperatures and drying periods for different species of fish, under different drying conditions. Páll says that by using the latest advancements in heat transfer technologies, it is possible to reduce the need for energy required for drying large quantities of fish, making locations and access to geothermal heat less important. "The container is mainly considered for use by smaller fish processing plants that wish to add drying processes to their operation in order to reduce waste, without costly and extensive construction or changes to their current facilities, but do have room for one container." The drying container is installed or attached to the facility from outside or within the structure. "The benefit of the container is that it is not a plant, but a drying facility. It is pre-assembled and only needs a simple setup at the customer's premises, who can then instantly start drying fish with little effort. The user can instantly begin drying of whole fish or different parts of the fish, increasing the yield of raw material, which in turn, increases the company's product range," he says. Icelandic design, inventiveness and experience can prove useful to anyone, who wants to improve the use of each fish for better yield of the catch.

Ever increasing fish consumption calls for further fishfarming

Upswing in fishfarming

Sigrún Erna Geirsdóttir

It is believed to be likely that fishfarming will provide the world two thirds of seafood around 2030. Conventional fisheries are considered to have reached their peak while the global demand continues to expand. Despite a rocky road in the history of Icelandic fishfarming, producers have now achieved a notable success and look forward to brighter days.

The value of the production could be estimated at 75-80 billion ISK, in contrast the current state of fishfarming products in Iceland delivers 6 billion ISK.

Majority of seafood in 2030

In light of growing fish consumption and the fact that fishing has likely reached its apex, attention has now been increasingly given to fishfarming as source of seafood. Fishfarming is a rapidly growing profession and Iceland is no exception. In the report Fish to 2030: Prospects for Fisheries and Aquaculture, published this year by the World Bank, it is reported that fishfarming will provide two thirds of fish consumption in the year 2030. These findings are in sync with those projected by the World Health Organization, which predicts that any increase in supply of seafood will come from fishfarms and estimates that the the production can reach 90 million tons in 2030. Specifically, it the heightened middle class consumption of fish which drives the demand, especally in China. Farming of fish or shellfish, has been the fastest growing farmed products during the past years on a global scale and continues to develop. The largest fishfarms are in Asia, where 90% of all farming takes place, and China is the leader with a total of 60% of the production. In Eurpoe were Norway leading the way and produced approximately 1,3 million tons in 2013, while Chile is the largest fishfarming country in the Americas, producing around 750 thousand tons. Icelanders have been looking toward fishfarming, but despite considerable investments in fishfarms, results were not delivered. Farming Arctic Char did, however, get off to good start and Iceland is now recognized as one the world's leading Arctic Char producers. And now, salmon farming has taken off too.

Upbeat in salmon farming

In a report published by the Iceland Ocean Cluster, three years ago it is stated that most global farming is for freshwater fish. Freshwater fish does not feed on fish protein as do most species being farmed in the northern hemisphere, but feeds on plants, organic remains and animals. Freshwater farming, therefore, tends to have a lower production cost. In Iceland, the centroid of fishfarming has been saltwater fish and migratory fish. Salmon is the most known migratory fish and success in farming salmon in Iceland has exceeded expectations. Even if farming of saltwater fish has been next to none, there are considerable hopes for cod farming. In the report, it can be seen that total production of fishfarming in Iceland has fluctuated a good deal over the years. In the years between 1985-2002 the production was at a stable 3-4.000 tons before rising considerably to 10.000 tons. The increase can be attributed to growth in salmon farming in 2003-2006. Due to difficulties, e.g. diseases, a number of producers left the profession and production declined again. Production and harvesting was stagnant in 2012-2013 and in 2013 the production was at 6887 tons. There have been some newcomers to the field and new species have been added, such as plaice farming in Reykjanes.

Bright times ahead

In the past, the greatest threats to the field of fishfarming were fluctuating markets, since demand was originally so small. As the market has grown, the fluctuations have decreased and the profession has become stable. The crash of the Chilean fishfarming in 2007, caused by a contagious pneumonia, opened the market for new entries and price of salmon grew considerably. It now seems there are bright times ahead in fishfarming, judging from the number of applications for fishfarming permits. At a convention held last year by the Icelandic Aquaculture Association, managing director Guðbergur Rúnarsson gave a talk and informed that current permits allow for a 42.000 ton fishfarm production. The value of the production could be estimated at 75-80 billion ISK, in contrast the current state of fishfarming products in Iceland delivers 6 billion ISK. It is clear that people are upbeat and fishfarming in Iceland could multiply in the next fifteen years. The most significant increase is expected to be in salmon farming and it is estimated that salmon farming will be 50% more in 2014 than the previous year. This increase will certainly lead to a rise in employment opportunities in fishfarming, and currently there are approximately 250-260 people directly employed by fishfarmers.

A great impact on the Westfjords

Since fishfarming has been most prominent in the southern Westfjords, the impact on employment and the economy have been evident as Patreksfjordur, Bíldudalur and Tálknafjordur have seen a lot of development. Inverse to the popular assumption, there was a population increase in the southern Westfjords between the years of 2012-2014, by 5%. One of the respondents in the report by Iceland Ocean Cluster informs that a considerable growth in salmon farming is now foreseen, and he believes the Icelanders are about to ride the third wave of upsurge in twenty years in salmon farming. In an article published in the Útvegsblaðið last year, it is reported that environmental conditions for fishfarming in the Westfjords have greatly improved in the last few years, as ocean temperatures have risen, leading to a heightened interest in fishfarming in the area, as elsewhere in the country. The winter temperatures have decreased by approximately one degree and has set around 1 degree, as opposed to the previous minus 1 degree in ocean temperature during winter months, a temperature causing nearly impossible growth conditions. In the report by the Iceland Ocean Cluster, the cod farming has a different tale, and there are ways to go before reaching profitability. Cod farming could be really worth striving for, as there is a great local knowledge in cod processing in Iceland and large investments have been made in cod production lines. The sales network for cod products is readily available and advanced. It is further reported that cod farming is unlikely to become extensive, but could reach a production of 50-100.000 tons.

"In the Westfjords, we are farming and processing both Arctic char and trout. In the south we are producing fish eggs and fry in three locations: At Fiskalóni and Bakki in Ölfus and at Húsatóftir in Grindavík," says Sigurður Pétursson, managing director of Arctic Fish and Dýrfiskur.

Rapid growth at Arctic Fish group

Icelanders have a story to sell

Sigrún Erna Geirsdóttir

Arctic Fish has experienced a remarkable growth since the company was founded three years ago. The company is now undertaking a project worth hundreds of millions of kronur deep in Tálknafjörður, where the company's fry breeding is taking place and plans are to further grow the operation.

Rapid growth

"In the Westfjords, we are farming and processing both Arctic char and trout. In the south we are producing fish eggs and fry in three locations: At Fiskalóni and Bakki in Ölfus and at Húsatóftir in Grindavík," says Sigurður Pétursson, managing director of Arctic Fish and Dýrfiskur. The company's main hatchery for trout is now located in Tálknafjörður, while seafarming is located in Dýrafjörður. The company has applied for marine fish-farming permit to operate both in the north and south of the Westfjords. The processing plant operated by Arctic Fish is located in Flateyri. The demanding Japanese market receives the majority of the trout production and Arctic Oddi produces trout sushi products according to detailed instructions. A portion of the production is sold and distributed in France, as fillets or whole round fish sold. The sales and distribution in France is run by Novo Food, a sister company of Arctic Fish. This past summer the distribution center was acquired, it is located in Boulogne sur Mer and was formerly owned by salmon giant Lerøy and employs ten people. The city is the heart of fish distribution in Europe and it is expected that the center will further strengthen the company's sales activities in Europe. Today, there are 80 employees working for Arctic Fish in Iceland and subsidiaries, and it is safe to say that Arctic Fish has experienced a unique growth since Sigurður founded the company in 2011 and was the only employee.

"We have organic farming, our own hatchery, natural feed, use geothermal heat and green energy."

Extensive construction

Arctic Fish operates own breeding program for improvement of the stock of Arctic Char eggs and Sigurður says that they are currently considering to do the same for trout eggs, which are being imported from Denmark. At the bottom of the fjord Tálknafjordur, Arctic Fish is now constructing a new farm for fry. The construction is the largest new construction in fry farming in Iceland since 1986. The construction began a year ago and first phase will be operational this winter. "At this location, three identical houses will be built providing tank space of 3000m3. This will threefold what we currently have available, in addition the station will use a new technology for reusable water," Sigurður says. The construction of house number two has begun and the goal is to start using it next year. The development is an immense investment and will cost hundreds of millions of ISK but Sigurður says that a good facility for fry production is simply the foundation for the company's future success. "There is a great need for a large land based hatchery center if we are to achieve the massive growth in marine fish-farming we are aiming for, and currently, the hatchery centers are a limiting factor."

Still to grow and prosper

When asked about the outlook for fish-farming in Iceland, Sigurður responds with optimism. "At Dýrfiskur, we are still taking our first steps in fish-farming and yet we are not at a point where all things run smoothly. Something new faces us every day and we have started believing that Murphy must have been a fish farmer! Our operation is moving in the right direction, slowly but surely." He says that mistakes are a part of learning and that there are still lessons to be learned. It is important to learn to live with the opportunities and obstacles in the Icelandic environment, which often are different from those in our neighbouring countries. "Even though conditions for marine fish-farming are not as good here as in most neighbour countries, we enjoy better land-based conditions, and that we need to learn how to better capitalize on," he says. Icelanders are selling a specific story and an experience, which is the central point of their marketing. "We have organic farming, our own hatchery, natural feed, use geothermal heat and green energy. In addition, we have a certification stating that our production is free from diseases and we use no curatives. We know that even if the sea is colder here and causing a slower growth, but we also know that our sea is cleaner and purer. Products from us Icelanders are not like those of others, and that we need to emphasize and build on. This is the story we must communicate."

A good regulatory framwork is necessary

Optimal use of land qualities

It seems that fishfarming will be a fundamental pillar in the economy of the south of the Westfjords. The area demands more residencial houses and improved transportation, for the north and south of the fjords to become a single economy. The future in fishfarming is bright, but also to move mindfully ahead.

Sigrún Erna Geirsdóttir

Fishfarming and derivative employment are one pillar of the economy in southern Westfjords and it is estimated that up to 150 people are directly employed in fishfarming. Today, fishfarming is growing rapidly and it is presumed likely, if plans follow through, that in coming years it will play an even bigger role in the economy of the area than conventional fishing. Höskuldur Steinarsson, managing director of fishfarming at Fjarðalax and chairman of the Icelandic Aquaculture Association, is one of the founders of salmon farming company Fjarðalax. The company operates in three fjords: Patreksfjörður, Tálknafjörður and Arnarfjörður and has a production licence for 4500 tons of salmon, annually. "We are currently in the application process for an additional production license for 6 thousand tons more," says Höskuldur. The application is undergoing an environmental assessment, along with applications from other producers. "The process is really time consuming and costly and will likely extend over two years." The company now employs 60 people and it is expected to need a considerable number of employees more as the production grows. "We are not able to hire only employees from the west, so people are moving to the area to work for us." Residential housing is, however, a limiting factor.

Höskuldur Steinarsson.

"Developments have been ongoing for a few years now, at quite a rate and now residential housing is scarce. We are hoping that this will be resolved soon as all employers in the area are really pushing for solutions." Due to the growth in employment, Höskuldur expresses their interest in imporving education in the area in the field of fishfarming at a college level. Until now, the company has needed to offer in-house education to employees who have various backgrounds, e.g. captains, engine attendants, aquaculturists and divers. Höskuldur says that it is both expensive and time consuming and it would be better if more people with relevant education were available. "The universities are now offering programs in aquaculture but we believe it would be good to start the education earlier in the school system. When there are employment opportunities close to where young people are growing up, it is likelier that they will stay and even better if they could attain education close to home as well." Höskuldur says that the fact that the Westfjords are not a single economy, due to unstable transportation, continues to be a limiting factor on growth, especially during winter months. "It truly is terrible that during a good part of the year there is close to none open transportation between the north and the south fjords. There is a dire need for a tunnel in Dýrafjörður and certainly the road Vestfjarðavegur must improve. If people in the north fjords could commute to work in south fjords, the businesses would be significantly better off. Not

When there are employment opportunities close to where young people are growing up, it is likelier that they will stay and even better if they could attain education close to home as well.

to mention the impact which fishfarming could have on the northern fjords as well."

Optimal use of land qualities

The reasons for the upsurge in fishfarming in the Westfjords is not least attributed to improved conditions for farming as ocean temperatures have been rising considerably for the past years. "We seem to have entered the righ beam," says Höskuldur. "In the west we get warm summers even if the winters are certainly cold. We have a slightly lower temperature than our competitors in the Faroe Islands, but by harnessing our geothermal water in hatcheries to grow larger spawn. The growth period for spawn is two summers and one winter and due to spawn size we can grow them within a competitive timeframe. In Iceland, we can use our land qualities to shorten the sea based growth time and keep production costs down," Höskuldur says.

Building on experience

The first wave of Icelandic fishfarming occurred around 1980 and it is commonly known that those early companies experienced many difficulties. Höskuldur says the reasons were threefold: Unsuitable stock, bad equipment, and insufficient knowledge. "The Icelandic stock being used at the time grew too slowly and thus, inapt for farming. The chosen equipment did not suit Icelandic conditions and the knowledge of the farming areas was simply not enough. He says that the situation now is completely different, equipment has improved greatly, as the stock and locations are now correctly chosen. "We could say that a second wave has now begun in fishfarmning, where Fjarðalax is one of the forefront companies. We have a terrific stock from Stofnfiskur at Vogar and enjoy the accumulated knowledge in the field. We further reach to Faroe Islands and Norway for knowledge and now know which pits to avoid. The knowledge also comes from the US, a market which buys about 70% of the production. We have become competitive to other countries in fishfarming," Höskuldur says.

High-quality production

The salmon from Fjarðalax is mainly sold to buyers like Whole Foods retail chain, which buys only certified production. "Such is our business model. We offer a disease free environment and use no antibiotics. We are not allowed to delouse, so we strive to keep our salmon louse free. We further build on the image of Iceland, where the water is clean from natural springs and emphasize that we use geothermal water in our farming." It is important for customers to know that Fjarðalax uses an interval between generations, meaning that farming takes place in two fjords at a time, while the third is rested. "The rest period is about allowing nature to maintain balance and not to challenge nature in any way, by exceeding any limits," says Höskuldur. He says that this operations model is a key, as transport costs from the area are great and it is impossible to compete with large producers like Norway. "To compete with Norway in their markets, would be like us challenging Brazil in football. We need differentiation in our products to achieve our higher prices. We may not always get the highest prices, but we never hit any low prices either, our sales price has remained stable and rather high."

"Here we have a disease free environment, hot water and can offer a certified production. In terms of fishfarming, the locations are suitable. It is easily justifiable to further develop for growth."

A good regulatory framework is necessary

Höskuldur believes that the future outlook in fishfarming in Iceland is very good. Now that production permits to Icelandic fishfarms, have reached 30 thousand tons annually and another 30 thousand tons have been applied for. "Fishfarming in Iceland is definitely here to stay. Foreign investors have been very interested and lately there are clear signs that they want to see first hand what we are doing. We see no direct threats, we enjoy a good and diffierentiated market position and the image of our country as a food producer is positive, which we can thank Icelandic fishery companies for. Here we have a disease free environment, hot water and can offer a certified production. In terms of fishfarming, the locations are suitable. It is easily justifiable to further develop for growth." He emphasizes the importance of doing with care and rationally build up the fishfarming, which is a new field. It is important that the public administration ensures an effective regulatory framework. Provided a good framework, it is possible to steer clear of different problems which Norway needs to deal with regularly, such as louse and other diseases. As a part of the effort to contain diseases it is further important to build on the principle of separating the generations in salmon farming, which is a strategic issue at the Icelandic Aquaculture Association. In Iceland, fishfarming is only allowed in a few areas: In the Westfjords, Eastfjords and Eyjafjörður and Höskuldur stresses the importance of organizing these areas diligently. "If many enter fishfarming and the regulation is not good enough, it can have disastrous implications." Fishfarming requires large investments and longterm vision, which the government needs to realize. "We cannot discount any demands. Hastiness will cause us all a great damage and jobs will be lost."

A GLOBAL LEADER IN ARCTIC CHAR PRODUCTION

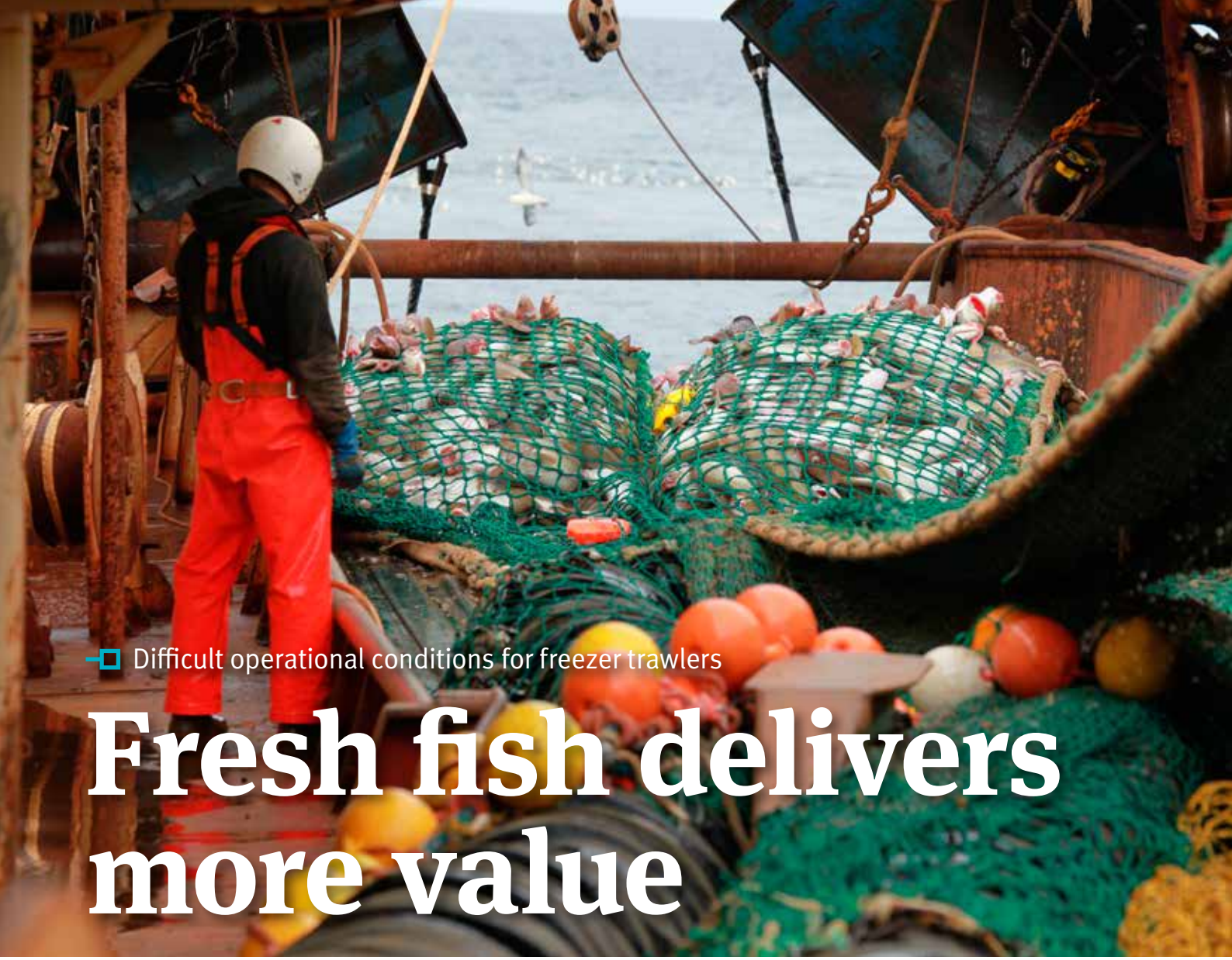
The current largest producer of Arctic Char in the world is Íslandsbleikja, owned by Samherji. The company operates in Grindavík, Reykjanes and Ölfus, and employs 70 people. Annually, Íslandsbleikja produces around 2200 tons of Arctic Char and the company Silfurstjarnan in Öxarfjörður produces roughly 1100 tons of salmon. The combined turnover of the two companies in 2013 was 2500 million. The better part of the production is exported fresh to the US and Europe.

Expansion in the pipeline

Fishfarming by Samherji produces Arctic Char and salmon, from fry to finished products. The fish is farmed in five locations but harvesting of salmon is in Öxarfjörður and harvesting and production of Arctic Char products takes place in the advanced processing plant in Grindavík. The company exports a lot to the US and to countries in northern Europe. "So far, we have not had a presence in Asian markets, but are certainly looking into it as the market really is interesting, China not the least," says Jón Kjartan Jónsson, managing director of Íslandsbleikja. Majority of the production is exported by air and the company's main customers are retail stores and restaurants, which specialize in high-quality products. All production by Íslandsbleikja is certified according to the specifications by Whole Foods. This means that there is no use of medical products and the colorant in the feed is purely natural, not to mention policies regarding sustainability and well-being of the fish and employees. Jón Kjartan says there is great interest in Icelandic high-quality products in the US and currently they are looking into possibilities for expansion regarding Arctic Char and salmon. "We are ever interested in growing. We are evaluating our current position in terms of markets and possibilities at our current operational locations. This year, we have built a few new tanks and are currently applying for further permits to expand production, which is a long and strict process but to a great extent it controls when an expansion is possible."

Delightful if the field would grow

Icelandic fishfarmers have seen good times and bad times through the years and Jón Kjartan says that it has brought a lot of experience. "Of course you try to build on and learn from experience to continuously perform better. Our fishfarms are landbased and this production has been in a steady development." A further increase in the field does require more people with educational background and specialized training. When asked about the outlook for growth in the field, Jón Kjartan says that most external factors are in its favor, for example the price of salmon is high. If companies in the field manage to reach maturity, this time around, they should enjoy future possibilities. "I hope that people will achieve what they have set out to do, it would be delightful to see the field grow even more in Iceland. I am rather optimistic when it comes to future outlook in fishfarming in Iceland. At Íslandsbleikja, we are driven to constantly improve and do better today than yesterday."



Difficult operational conditions for freezer trawlers

Fresh fish delivers more value

Sigrún Erna Geirsdóttir

The proportion of cod being caught by freezer factory trawlers has greatly decreased, to a point where cod is only a bycatch while fishing for red fish, saithe and Greenland halibut. At the peak of operational freezer trawlers in 1992, the number of vessels was 35, but now count only 23, and are projected to further decrease in numbers. It is safe to say, that changes have occurred to this branch of the fishing industry. Oil cost and salary expenses are high and uncertainties regarding fishing opportunities and fishing fees pose a problem.

Decreasing share of freezer trawlers

In a recent report by Matís, Investment management in freezer trawler operations, the reasons for the decreasing share are discussed, along with a detailed analysis of individual operational factors of freezer trawlers. Factors including payroll expenses and fishing fees are analysed along with their financial effects on the operation. The authors of the report relate the diminishing share of freezer vessels in cod fishing to an increase in oil prices during this period, as well as the high energy cost in freezing at sea, which by far exceeds the energy cost of land-based freezing. Salary expenses play a deciding role as well, which are considerably higher at sea than at land-based production. Marketing has added to the effects, as the value of fresh fish has been greater for the past few years, leading to a decreased emphasis on frozen products. In addition, the fishing fees have caused an uncertainty.

Fresh fish has a greater return

Vilhjálmur Vilhjálmsson, CEO of HB Grandi, says that cod is considerably more valuable fresh than frozen. "Customers are simply prepared to pay a higher price for fresh fish than frozen." However, Vilhjálmur does not expect that under current conditions, freezer trawlers will disappear from the fleet, since freezer trawlers are more economical in catching certain species, such as Greenland halibut, oceanic red fish and greater silver smelt. "Additionally, we have opted to send freezer trawlers to catch our quota in the Barents Sea," Vilhjálmur says. "It is, however, necessary to emphasize that changes to the operational environment, demand, conditions of fish stocks or governmental decisions, can easily cause a further decrease of freezer trawlers, or cause an increase." When asked about projected operational conditions for freezer trawlers, Vilhjálmur says that inevitable costs, including salaries, oil, insurance, maintenance, fishing gear etc., account for 70-75% of the catch value. On top of that, there are fishing fees, cost of capital and other mandatory costs. "Therefore, operational conditions are not looking so good, and will partly be determined by the long-term arrangement of fishing fees," Vilhjálmur says.

Regulations on bycatch processing

In the fall of 2012, rules on processing bycatch on board freezer trawlers were tightened, as the vessels were mandated to land a higher proportion of codheads. The proportion depends on the cubic measure of the vessels cold storage capacity but do not consider profitability, efficiency nor increased salaries to the ordinary seaman. According to the regulation, freezer trawlers with cubic measure of the hold between 600 and 800 cubic meters are obligated to land 30% of codheads from catch within the fishing jurisdiction. Freezer trawlers with holds larger than 800 cubic meters are to land 40% of the codheads, but trawlers with holds under 600 cubic meters are exempt from the regulations. Instead of landing the heads, vessels are allowed to land a corresponding volume of other production from heads, such as chins and cheeks. The Matís report finds that this regulation will not increase value creation since the vessels are not designed to process heads and the fishermen earn next to nothing for the work demanded in processing. The regulation may even lead to a decrease in pay to the deck crew.

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"Therefore, operational conditions are not looking so good, and will partly be determined by the long-term arrangement of fishing fees," Vilhjálmur Vilhjálmsson, CEO of HB Grandi.

Fewer investment potentials

The authors of the Matís report conclude that as the freezer trawlers are made to increase onboard processing of bycatch, then the fisheries are limited to make investments, which in turn is key for the fishing companies to maintain product development. Today, on board most freezer trawlers, heading machines made for processing redfish are used to head all fish species, since there is no more space available for other production lines on board the vessel. Due to this universal use of the redfish heading machine, the most valuable portion of the cod and the haddock are lost. This happens as the heading machine cuts the fish in such a way that the front part of the loin follows the head instead of the loin. Parts of the liver and the wing are also lost, which in turn complicates the processing of the heads at drying factories, further decreasing the price of the product. The authors further report that the effects of the regulation appear to be minimal, and mostly impact vessels which had been processing codheads anyway. Most Icelandic freezer vessels are exempt from the regulation, as most of them have smaller holds than 600m3. It is expected that designers of new freezer trawlers will take these demands into account. The authors reason that valuables are currently being discarded, and that corrective actions are imperative. It is necessary to renew the fleet of freezer trawlers and important that the fishing companies have the leverage to do so.

The share-allotment system prevents investment

The report authors further deduct that the salary system for fishermen actually impedes the fishing companies. Today, the situation is that the share-allotment system, which was negotiated in 1986, does not encourage investment in new equipment or products. If salaries for work on board the vessels are compared to land-based production, then it shows that the average pay for fish-processing labor in 2010 was 5.735.000, based on 11 months of work. For the same period the salary for a deckhand on vessel Örfirisey reached 11 million for 7 ½ months of work. All things considered, if a fishing company wants to invest in new technology, for example to increase yield, the company can never expect more than 60% of the increased revenue, which would neither suffice to cover the cost of capital, nor to increase the company's profit. The authors of the report add that incentives to increase worker productivity are non-existent. Often it may not be beneficial to invest in technology to downsize a crew. For example, if a fishing company invests in an automated freezing production and packing line for 25 million, it can decrease the number of employees by one per shift on the processing deck. The share for the crew would decrease from 31.5% to 30%, but extra shares would increase, since the share to vessel officers would increase. The authors do point out that a fishing company can request to negotiate a lower share-allotment to the crew if it is being hired to a new vessel, and there are precedents for this. In addition, there are clauses in the contracts which allow for a 10% discount on share-allotment during the first 10 years.

Essential to eliminate the uncertainty

According to numbers from the Directorate of Fisheries, fishing fees to be paid by the Icelandic fishing fleet, totalled 10 billion in 2013 and have risen considerably since they were first established in 2002, when they reached a billion.

The authors of the report pose the question, whether such a levy, in addition to conventional income tax, can impede investment in equipment and product development on board freezer trawlers, resulting in a marginalized revenue for the economy. They believe that the conditions for operating freezer trawlers are being threatened with heavy fishing fees and support their argument by the reduction of fishing trawlers for the past few years. Furthermore, they point out that the uncertainty surrounding the execution of fishing fees is a heavy burden for the industry and that the uncertainty regarding the country's fisheries policy needs to be eliminated. It is believed to be impossible for fishing companies to operate in a regulatory environment which regularly changes by the direction of the political winds. It is essential to consider all stakeholder needs and reach a conclusion where most interests are accommodated. In this context, the report from Matís, discusses a 2012 analytical work by Sindri Magnason, who finds that the fishing fee is at optimal when set at 19.5% and labour cost at 41.4%. These two prerequisites best support the objective to maximize the benefits of all stakeholders, and at the same time encourages investment in equipment and products.

Incentive for growth

In Sindri´s analysis it is suggested that setting the fishing fee at 19.5% will ensure the fishing company 38% of the profit, which is necessary to maintain a healthy operation, while simultaneously providing payments to the state treasury and creditors. Any higher fee will be disruptive and discourage the fishing companies to invest in growth and development. Sindri further proposes a change to the share-allotment system which would encourage investment by the companies and encourage ordinary seamen to seek further education for a higher pay grade. In the Matís report, it is stated that increased investment and technical advancements in equipment and production would lower cost and increase future revenue, for the benefit of all. Increased value creation would lift the ordinary seaman's pay and the revenue of the state treasury, increase profits to the fishing company and lower the risk to investors and creditors. This would in turn, lead to a lower interest rate. In conclusion, a moderate fishing fee and an improved salary system could result in increased investments in product development, machinery, on-board equipment, and new vessels. This could further increase enthusiasm to invest in the fisheries sector. It is stated in the Matís report that these four factors are precisely the ones currently missing from the operations of freezer trawlers and important to reform. The report says that, in fact, this is true for other branches of the fishing industry.

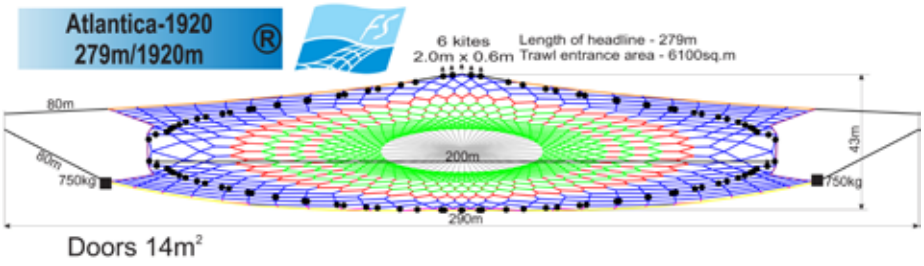
3 sesons for Atlantica 1920 from Fishering Service Onboard Huginn servicing as main Trawl

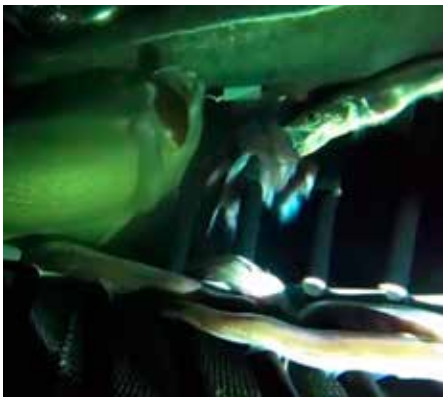
Guðmundur Ingi Guðmundsson relife captain and first mate states the trawl outperformance other gear good resaults less time for fishing, fuel saved more proffit for each trip. The trawl first came onboard on trial basis, performance was obvius so it has bine there for 3 seasons of mackrell and Herring fishing. Atlantica 1920 is used now onboard many vessels for diffrent aplications. Atlatica 1920 deliverd to Vilhelm Þorsteinsson (3 trawls), Beitir, Fagraberg, M.S Agapov, Pacific Hunter, Mekhanik Kovtun, Staryy Arbat.

Diffrent types of bellys are available for the net, same net is used for Blue whitening and other species. It takes short time to change belly (back end), making the same net more usefull.

1920 and other FS trawls have simulation with all variaty added in Fishering Service own Trawl simulator, resaults are relly accurate and match gear operation to speed, flow, stretch and other factors related trawl elements.

This season Huginn has used iTrawl.com camera system to check diffrent parematers and performance of the gear related to tow speed and currents. Every year Atlantica trawls take change regarding build design and other variaties. 2015 version of Atlantica design will have good data from iTrawl.com to build berst performance Pelagic Gear.





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