

RURAL ECONOMY AND CONNECTIVITY COMMITTEE

SALMON FARMING IN SCOTLAND

SUBMISSION FROM FISHFROM LTD

Introduction: FishFrom Ltd. was incorporated in May 2012 and is an innovative Scottish aquaculture business. It was created by industry professionals to develop the commercial viability of growing salmon in recirculating aquaculture systems (RAS) in a more sustainable way. Since inception the company has raised £1.6 million to bring this project to the point of construction. We believe that this approach can address many of the questions being asked by both parliamentary committees.

Status: FishFrom Ltd. have planning permission to construct a 2,100 tonne RAS land-based Atlantic salmon farm on the Kintyre peninsula. The company will also produce over 1 million, 450g post-smolt for the industry annually. Construction of this first farm is due to commence during the summer of 2018.

The Committee would like to hear your views on the following questions:

1. Do you have any general views on the current state of the farmed salmon industry in Scotland?

Despite being a relatively young industry, it has proven in recent years to be highly innovative and able to deliver a valuable product to the consumer. It still has many challenges to address:

-) Biological & Environmental
 - o Amoebic Gill Disease
 - o Sea lice (*L. salmonis* and from other pelagic stocks, *Caligus*)
 - Availability of cleanerfish (wrasse and lump sucker)
 - o Algae bloom
 - o Jellyfish infestation
 - o Predation (seals, porpoise, cormorant)
 - o Sea borne pathogen (ISA, PDV, IPN etc.)
 - o Adverse weather events
-) Growth and development
 - o Availability of new sites that can be located in areas where they can be serviced by existing infrastructure
 - o Anticipated growth targets will impact significantly on the environment
 - o Adequate benthic dispersal for existing and new sites
-) Production
 - o High mortality rates and subsequent disposal costs
 - o Escapes and introgression with wild salmonids
 - o Infrastructure capable of withstanding oceanic site weather conditions

) Feed

- Industry growth is very dependent upon availability of sustainable protein sources

2. There have been several recent reports which suggest how the farmed salmon industry might be developed. Do you have any views on action that might be taken to help the sector grow in the future?

We believe that given the environmental challenges of the sector, mentioned above, the most progressive and environmentally sustainable way forward will be through the increased development of land-based RAS facilities. To promote this pathway to growth, innovative organisations in the RAS sector of industry need the practical and financial support of government alongside private investment, to take prototype developments to full commercial reality.

3. The farmed salmon industry is currently managing a range of fish health and environmental challenges. Do you have any views on how these might be addressed?

FishFrom's RAS farming approach creates a complete biological firewall keeping the farmed environment separate from the natural environment and local ecology. This means that fish are grown in a completely controlled way, free from pathogens and parasites, predation and weather events. As our systems are fully contained and bio-secure, we will not require to vaccinate the stocks. There is no need for chemical treatments in the production process.

Fish cannot escape the facility and therefore there is no potential for breeding with wild salmonids. We control temperature and light and keep salmon in a stress-free habitat. Anticipated mortality will be less than 5% of the total stock. We will collect and manage all of our waste streams and convert these to renewable energy and other recoverable materials.

It has been widely reported that within the aquatic food chain micro-plastics are becoming more prevalent. By thoroughly screening all influent water such contaminants will be removed from the farm environment.

4. Do you feel that the current national collection of data on salmon operations and fish health and related matters is adequate?

It is a considerable challenge to gather consistently accurate data from an ever-changing environment as found within a marine farming operation. However, our RAS farming operations rely on advanced technology to control all biological performance. This creates a large amount of real-time data which leads to a completely transparent business.

5. Do you have any views on whether the regulatory regime which applies to the farmed salmon industry is sufficiently robust?

The salmon industry regulatory regime is criticised from out with industry as not being sufficiently robust and from within industry as being the most regulated within the food production sector.

Regulation is required to be robust in the following areas:

-) Management and welfare of aquatic species
-) Risk to the environment by the actions or omissions of the industry
-) Worker safety
-) Food safety

The industry has signed up to the Code of Good Practice (<http://thecodeofgoodpractice.co.uk/>) for a reason, and this should be the starting point from which regulation and self-regulation should be based.

6. Do you have any comments on how the UK's departure from the European Union might impact on the farmed salmon sector?

It is as yet unclear as to the position of devolved powers with legislation returning from EU to the UK. It would be detrimental to have more than one standard across the UK in terms of legislation regarding livestock and food production.

The current free passage of goods through the customs union allows for timely delivery of Scottish seafood to such destinations as Boulogne and maintains the freshness of the products. Any risk of hard borders and increasing the times to clear customs will miss deadlines for onward distribution throughout the EU, reducing product shelf-life and value to the customer.

Specific areas of concern with regard to the salmon sector post-Brexit:

-) The movement of genetics such as sperm and ova to/from Norway, Ireland and Iceland currently through the FHI and the TRACES system – what will be new in legislative terms? – beneficial or counter-productive?
-) Trade tariffs, trade wars or closing borders and the impact on cost and free movement of:
 - o Genetic material
 - o Equipment
 - o Feed and feed ingredients
-) Sale of product into Europe/EEA
-) Trade deals to be had with countries out with the EU
-) Availability and restrictions placed upon migrant workers
-) Withdrawal of European funding (i.e. EMFF) which has been significant to technology development within the sector

Note to the Committee

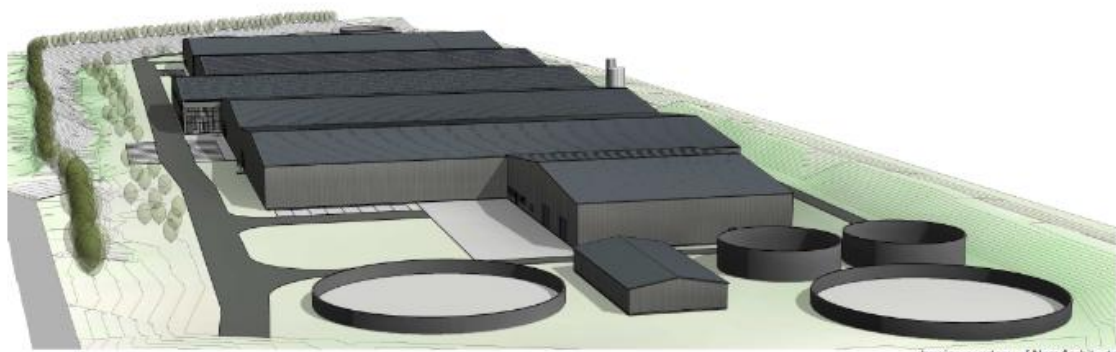
FishFrom are developing a ground breaking fish farming facility in Scotland. As this is radically different to anything found at present within the Scottish aquaculture industry we have attached an appendix offering further details regarding our business.

We welcome the opportunity to input into this inquiry and would be happy to provide the Committee with further explanation.

FishFrom Ltd

April 2018

Appendix I: FishFrom Ltd. - Background information



View from North East

drawing courtesy of Norr Architects

Executive summary

Feeding the world's growing population has now become one of the biggest challenges facing society today. The UN's Food and Agriculture Organisation have stated that simply to keep pace, pro-rata, we will need to increase aquaculture output by 62 million tonnes by 2030; effectively doubling existing production. It is imperative we find sustainable and innovative ways to meet the collective rising food and nutrition demand.

FishFrom can affect a lasting impact on that global effort through offering an aquaculture solution that farms fish in a sustainable, predictable, healthy and highly profitable way. In doing this, we will also materially change the way we think about food production – how we must adapt and innovate to bring about the change that is so critically needed.

By 2050 it is estimated that the population of the world will have increased to 9.5 billion and a vast number of those will have no access to basic nutrition. Climate change is having an exaggerated effect on the world's crops and continual harvest failures across Europe and North America will intensify our thinking about future food security. Commodity prices are soaring and we need to act today to meet the challenge. The fish industry is no exception. Overfishing, mismanagement of crucial feeding grounds and unsustainable farming methods are threatening fish stocks and the long-term supply of fish to market.

FISHFROM'S Vision – Replicate the technical and operational FishFrom processes to build new farms across the UK, Europe and the rest of the world. This will aid the world's growing population to access a valuable source of affordable protein provided by the most sustainable form of fish production.

Our Mission: FishFrom Ltd has been formed to provide customers with a consistent and predictable supply of premium-quality farmed salmon utilising world leading technology that minimises impact on the environment and maximises animal welfare and efficiency.

Our trademarks will include:

-) **Quality** – Our fish will be of the highest quality, reared in a controlled environment where it is protected from harmful pathogens and parasites without the use of harsh chemicals. The taste of our fish will be better than the highest quality farmed fish available.
-) **Fresh** – Our farms will enable us to produce fish closer to market thus reducing food-miles and the carbon footprint of fish production. Fish can be on sale within hours of being harvested.

-) **Predictable** – We offer our customers the delivery of fresh fish 7 days a week and 365 days a year.
-) **Ecologically Safe** – Our fish will be produced away from wild stocks, using physical and biological firewalls that cannot be breached.
-) **Welfare** – The critical parameters of temperature, lighting, food and water quality will be controlled at levels to ensure fantastic health and welfare for our fish. Close containment allows us to protect our stocks from marine and land-based predation as well as algae blooms and jellyfish infestations.
-) **Environmentally Sensitive** – Our systems will recycle 99.98% of all the water. Our fish food will come from sustainable resources and our waste and effluent will be treated to negate any environmental impact; indeed, it will be used positively as either fertiliser or for biogas regeneration.

Our Strategy

The initial part of the project is to build a 2,100 tonne close containment, shore-based salmon farm with post-smolt production facilities on the Kintyre peninsula in Argyll (Scotland) using the latest RAS (Recirculating Aquaculture System) technology. The farm and all operational processes will be contained under one roof to maximise performance and minimise operational risk. This will be followed by the construction of similar farms. We are already in discussions to expand the business model to a global audience.

Fish welfare is of paramount importance to us and some of the essential elements of that are the 'What', the 'When' and the 'How' they are fed. The feed will be specially formulated for close containment operations, not only to give the fish the correct balance of proteins, essential oils and nutrients for healthy growth but also to reduce the non-nutritional elements thus producing less waste. The feed will be made from a low-marine index feed utilising sustainably grown protein as an innovative feed source. Less than 1kg of this diet, specially formulated for RAS production, will be used to produce 1kg of added weight. The feed ingredients will be mixed with other plant proteins and algae oils to ensure a perfect dietary balance for salmon.

Throughout all our systems a complete biological firewall exists to protect both wild salmonid and farmed stocks. This prevents cross-fertilisation and keeps our farmed stocks free from parasitic invasion and other waterborne diseases or pathogen. Sea lice and Amoebic Gill parasites cannot exist within the farm and the risk of predation from birds and mammals is also removed. Toxic algae and jellyfish infestations are also completely avoided.

Company overview

FishFrom Ltd has been created to produce high-quality, farmed salmon through using the latest RAS technology on a controlled, commercial scale. By utilising several unique production techniques that, when combined, form an efficient and sustainable way of producing affordable protein that can be replicated in all parts of the world. Initially, we will prove the commercial reality as FishFrom develops its first large close containment production unit at the Tayinloan site.

The business idea

The concept of Closed Containment RAS (Recirculation Aquaculture Systems) for fish farming has been in existence for many years with many different species of fish, including Trout, Tilapia, Eel, Bass as well as salmon using this technology. The Freshwater Institute in West Virginia has successfully grown Atlantic salmon to harvest size in fresh water under a research project for the Conservation Fund with sponsorship coming in from the Atlantic Salmon Federation. FishFrom will recreate this on a commercial scale using tried and tested equipment. Combined with our innovative and sustainable technologies, this business idea meets all the requirements of a modern, adaptable and acceptable method of cost-effective, global food production.

Our USPs

Exceptional product quality and customer service

-) Totally predictable supply of fish to market
-) Strong marketing and improved industry image
-) Instantaneous complete traceability and reporting

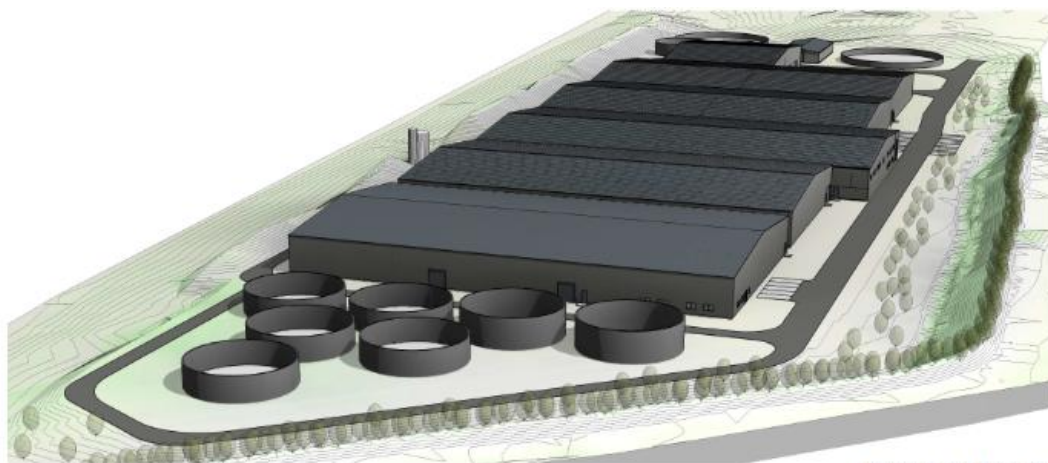
Sustainable

-) Financially:
 - o Ability to offer consistent pricing
 - o Profitable at commodity pricing
 - o Strong control of own value chain
-) Socially:
 - o Employing local workforce and engaging local contractors
 - o Enhanced food security opportunities for other countries
 - o Improving local economy and services
 - o Export of technology and competence
-) Environmentally and ecologically:
 - o Optimal salmon growing conditions; temperature, water quality, light and feed
 - o Minimal fish stress (no interaction with predators, sea lice, jellyfish or storms)
 - o No Sea-lice treatments and the use of harsh chemicals such as Cypermethrin
 - o Minimal impact on ecology particularly with sea-bed and wild salmonids
 - o Low carbon footprint ~ single site production
 - o Biological and physical firewall through process control and containment
 - o Close to Market
 - o Powered with renewable energy
 - o Conversion of waste streams to fertiliser, or biogas generation, and other by-products

Innovative fish-farming methodology

-) Scalable production processes using either fresh, brackish or saltwater
-) Enhanced food security
-) Maximising fish welfare
-) High quality protein supplied at commercially viable prices
-) Robust, viable business model with global opportunities
-) Creating systems to meet aquaculture legislative requirements

Complete process control including the ability to observe fish all day – every day!



View from South

drawing courtesy of Norr Architects