



Objectives and course of action in the policy for the structure and framework of aquaculture until 2040

A preliminary draft of the Icelandic government's policy as concerns the structure and framework of aquaculture was revealed in the government's public consultation portal (*Samráðsgátt*) in October 2023.

The policy, which covers the period until 2040, aims to create the necessary conditions for this sector to generate increased value creation through an ecosystemic approach driven by sustainable principles.

The document sets out a 2040 vision for the subsectors comprising aquaculture (traditional marine-cage farming, land-based farming, offshore farming, and algae farming). The policy considers the objectives of each sector for that vision to become reality. The document furthermore contains an action plan for the period until 2028, designed to carry the policy through. That action plan will be updated annually while the policy is in force. This document contains the aforementioned objectives and course of action of this policy.

2.1 Science-Based Approach

Research and monitoring

The Situation in 2040

-
1. The operation of traditional marine-cage aquaculture in Iceland meets all the criteria for being a sustainable industry. The scope of the industry is based on the science of an ecosystemic approach and prudence.

 2. The growth and continuity of wild salmon stocks has not been impacted by traditional marine-cage aquaculture.

 3. The impact of traditional marine-cage aquaculture on the environment and marine

ecosystems has not exceeded the parameters set by Act no. 36/2011 on Water Resources Management.

4. The public has a clear and unrestricted right of access to information about the environmental impact of the industry.

5. Environmental research and monitoring of traditional marine-cage aquaculture is funded in a reliable and predictable manner.

6. The use of best practices in environmental research relating to traditional marine-cage aquaculture is ensured.

An Action Plan Leading Up to 2028

1. A real-time monitoring panel will be established which displays the results of bearing capacity assessments and monitoring efforts.

2. Legislation will be clarified to define which areas are subject to a bearing capacity assessment by the Marine and Freshwater Research Institute. That legislation will also define parameters for re-assessment.

3. A risk assessment on genetic admixture and bearing capacity assessments will be provided as scientific consultation from the Marine and Freshwater Research Institute.

4. A risk assessment on genetic admixture will be conducted and applied to the total fish count, rather than biomass.

5. The criteria, methodology, and parameters to assess the risk of genetic admixture have been further developed and amended to reflect necessary changes arising from monitoring and researching efforts on the impact of traditional marine-cage aquaculture on wild salmon stocks.

6. In accordance with the government's fiscal plan for 2024-2028, two additional employees responsible for executing bearing capacity assessments will be hired at the Marine and Freshwater Research Institute in the period leading up to 2028.

7. In accordance with the government's fiscal plan for 2024-2028, seven additional employees responsible for carrying out environmental and ecosystemic impact monitoring will be hired at the Marine and Freshwater Research Institute in the period leading up to 2028.

8. An incentive framework will be implemented with regard to escaped fish from aquaculture farms.

9. Existing conservation zones will be entered into formal legislation.

10. The number of Riverwatchers will be 17 by the year 2028.

11. The Task Force's proposals of how to combat escaped fish will be implemented.

12. Parameters and utilisation plans will be implemented for all salmon rivers in Iceland. One new employee at the Marine and Freshwater Research Institute will be responsible for implementing this.

13. Regional Ocean Modeling System (ROMS) will be utilised for assessing the distribution of sea lice.

14. Increased cooperation between the Marine and Freshwater Research Institute and the Environment Agency of Iceland regarding shared access to data on environmental impact.

15. Iceland's admission to the North Atlantic Salmon Conservation Organisation (NASCO) will be reinstated.

2.2 Improved Animal Welfare

Sea lice, disease, and mortality

The Situation in 2040

1. Mortality in traditional marine-cage aquaculture is less than 10%. This is a consequence of improving preventative measures, incident response, and the organization of operations, as well as a better understanding of the issues at hand.

2. Fundamental research and epidemiology are of central importance to the industry. The scope of surveillance, preventative measures, and response from surveillance authorities will be based on those principles.

3. The impact of sea lice on traditional marine-cage aquaculture has decreased and the situation in Iceland is superior in comparison to our neighbouring countries. This is a

consequence of an improved understanding of the issues at hand, the implementation of an incentive system, and improved equipment. The situation is reflected in the reduced need for medicinal intervention.

4. The effects of sea lice on wild salmon and other salmonidae is monitored closely.

An Action Plan Leading Up to 2028

1. Leading up to, and following, the revision of the Act on Aquaculture in the spring of 2024, the implementation of proposals made by a task force on disease prevention in January 2023 will be completed. Moreover, close attention shall be paid to the provisions of the EU regulation on transmissible animal diseases (EU/2016/429) and other associated EU regulations.
 2. As part of the revision of the Act on Aquaculture in the spring of 2024, special attention will be paid to the definition and harmonisation of concepts in the various rules and regulations, such as the term “traditional marine-cage aquaculture area” (“sjókvíaeldissvæði”).
 3. During subsequent revisions of the Act on the protection against fish diseases no. 60/2006, the role and purpose of the Fish Disease Committee will be reassessed.
 4. Clinical research on the drug resistance of sea lice will be bolstered, in cooperation with license holders, independent veterinarians employed by operators in the industry, as well as government entities, with the goal of managing drug use and reducing the risk of drug resistance.
 5. The monitoring of lice affecting wild salmon stocks will be implemented.
 6. Regional Ocean Modeling System (ROMS) will be utilised with regard to the distribution of sea lice.
 7. An incentive system, relating to mortality and sea lice, will be implemented in a way which rewards operators who obtain good results, while limiting production for those operators who do not obtain the required results. This incentive system will be based on fish count and not on biomass limits.
-

2.3 Risk-Based Organisation

Organisation of licenses, delineation, and distribution of aquaculture areas

The Situation in 2040

1. A single license-holder is permitted to operate in each fjord or other specified marine area.
 2. The monitoring of disease prevention, animal welfare, and environmental impact is as efficient as possible, given the organisation of licences. Organisation of licences forms a basis for increased and consistent value creation for operators and the community.
-

An Action Plan Leading Up to 2028

1. Reorganisation of licenses in the Westfjords will be completed. Only a single license-holder can operate in each fjord or specified marine area. Operators will be given the opportunity to propose amendments to licensing in aquaculture zones, within the framework established by the government.
 2. No new licenses will be issued in the period leading up to 2028 which would go against the policy of a single license-holder operating in each fjord or specified marine area.
 3. All older licenses which fail to comply with the policy of a single license-holder operating in each fjord or specified marine area will have been revoked.
 4. The Marine and Freshwater Research Institute has delineated disease-control areas by aquaculture zones where a single license-holder operates.
-

2.4 Enhanced Government Institutions

Monitoring and licensing

The Situation in 2040

1. The government entities operating in the field of traditional marine-cage aquaculture support the advancement of the industry. Government entities are adequately funded and have the required and appropriately skilled manpower to carry out tasks to a satisfactory degree.
 2. Government entities jointly utilise equipment, data and databases in their monitoring and resolution of issues arising out of traditional marine-cage aquaculture.
 3. The role of the various government entities does not overlap more than necessary.
 4. Government entities have clear legal authority to enforce compliance and recall licenses.
-

An Action Plan Leading Up to 2028

1. In accordance with increased funding, pursuant to the government's fiscal plan for 2024-2028, the number of job positions relating to aquaculture at the Food and Veterinary Authority will be increased from 7.6 to 20. Moreover, the job positions at the Marine and Freshwater Research Institute, relating to aquaculture, will be increased from 7.5 to 18.5.
-

2. The Food and Veterinary Authority will be provided with the necessary equipment to carry out monitoring efforts in an effective manner. Some monitoring equipment will need to be obtained from license-holders, as it is not realistic to own all the necessary equipment or transfer that equipment between disease prevention areas. Operators will be legally obliged to provide government entities with access to the necessary equipment with minimal notice.

3. Cooperation of government entities, in particular between the Food and Veterinary Authority and the Environment Agency of Iceland, will be increased, with the aim of increasing joint use of manpower and equipment. The Ministry of Food, Agriculture and Fisheries shall coordinate efforts to increase cooperation between all entities which are involved in monitoring and regulating traditional marine-cage aquaculture.

4. Work will be underway to implement a single electronic data portal for the submission of applications and forms, where applicants and license-holders can file all the relevant documentation and information, as well as monitor the progress of their applications or status of their filings. All relevant government agencies shall have access to this electronic data portal.
5. Legislation will be amended so that government entities have clear, legal authority to enforce compliance measures and recall licenses.

2.5 Contributions from a Shared Resource

Taxation and distribution of proceeds

The Situation in 2040

1. The taxation of traditional marine-cage aquaculture is fair and transparent, is based on a simple methodology, and contributes to society without hampering investments in the industry.

2. The funding of statutory projects in the fields of government administration, monitoring and research is ensured through a reliable income stream.

3. Taxation of traditional marine-cage aquaculture involves economic incentives to stimulate development and expedite the use of production methods which support improved environmental standards and animal welfare.

4. Funding is provided to municipalities hosting traditional marine-cage aquaculture in accordance with the scope of aquaculture in the relevant community. The funds will be provided in a way which allows the community in question to factor traditional marine-cage aquaculture into fiscal planning.

An Action Plan Leading up to 2028

-
1. Production fees will be amended to reflect the price of products at any given time and to be more sensitive to price fluctuations, both increases and decreases.

 2. Economic incentives will be implemented to promote production methods which support improved environmental standards and animal welfare. The incentives will be applied to the tax levied on individual operators in accordance with their performance.

 3. Rules regarding the Environmental Fund for Aquaculture will be changed so that 80% of distributable funds will be allocated to the Marine and Freshwater Research Institute and its statutory roles relating to aquaculture. The remaining 20% will be allocated to other applicants.

 4. The income of municipalities hosting traditional marine-cage aquaculture will be ensured in a more transparent and reliable manner. Municipalities hosting traditional marine-cage aquaculture will no longer have to apply for distributions from the fund but rather they will be guaranteed to receive a share of the distributable funds based on certain parameters, including the number of each municipality's habitants.

 5. The management of production fees will be transferred to the Food and Veterinary Authority.
-

2.6 Investing in the Future

Education and knowledge

The Situation in 2040

-
1. The industry and the education system have a close and ongoing dialogue regarding the needs of the industry and the capabilities of the education system to fulfil those needs. The organisation of internships is a significant part of that dialogue, as on-site training is an important part of vocational education.

 2. The level of education in the industry is high. Employment in aquaculture is desirable and

sought after, and offers competitive compensation. This is reflected in the diverse range of education opportunities pursued by students who wish to obtain an education in the industry.



An Action Plan Leading up to 2028

1. The possibility of setting up a professional advisory council will be explored, in cooperation with the Ministry of Education, regarding the organisation of education relating to aquaculture in general. Such an advisory council would include representatives from the education system and the industry, and would be responsible for establishing the overall needs of the industry and the capabilities of the education system to meet those needs. The Ministry of Food, Agriculture and Fisheries will take the initiative of implementing this cooperation.
2. It would be the role of the advisory council to develop curricula and organise further education in the field of aquaculture. A broader range of educational opportunities will be available to both new students and those already working in the industry.
3. The standards of education for experts in fish pathology need to be defined in accordance with Regulation EU/2016/429 on transmissible animal diseases.
4. The allocation of a portion of the funds received by the Environmental Fund to a separate environmental and education fund will be explored. That portion of funding would support research not undertaken by the Marine and Freshwater Research Institute, and furthermore support students in higher education wishing to pursue further studies relating to aquaculture in Iceland.

2.7 Green Progress

Climate goals and energy transition

The Situation in 2040

1. All wellboats and feeding barges are connected to onshore electricity when in harbour.
2. Most feeding barges are propelled by electricity. All feeding barges propelled by an internal combustion engine use electrofuels or other sources of energy that are more suitable than fossil fuel. Hybrid solutions are widely applied.

3. Where possible, feeding barges will be connected to onshore electricity while in operation.
-

4. Wellboats are not propelled by fossil fuel. Most are propelled by electrofuels or other sources of energy which are more suitable than fossil fuel. Hybrid solutions are widely applied, and an increasing number of wellboats are propelled only by electricity.
-

5. Domestic production of feed for aquaculture, using domestic energy and material, has increased substantially.
-

An action plan leading up to 2028

1. The Food and Veterinary Authority will be tasked with maintaining a register of service vessels, feeding barges and wellboats, both those operated by licensed producers in aquaculture and those operated by independent service providers. This will provide overview over the energy utilised by vessels operating in traditional marine-cage aquaculture.
 2. Local authorities, government entities and energy companies will join hands with the aquaculture industry and independent operators to develop a status overview and work towards a reduction in carbon emissions from traditional marine-cage aquaculture.
-

3.1 An Efficient Licensing Process *Administration and licensing*

The Situation in 2040

1. The government entities overseeing land-based aquaculture support the progress of the industry, given that the necessary conditions with regard to environmental and societal impact are present.
 2. All government entities involved in the administration of land-based aquaculture are sufficiently funded in a reliable and predictable manner.
 3. All government entities involved in the administration of land-based aquaculture are sufficiently staffed and have access to the resources needed to be able to undertake their roles to a satisfactory standard.
 4. Licensed operators and applicants can submit their filings and applications to the relevant government entity via a centralised electronic portal.
 5. Government entities involved in the oversight of land-based aquaculture share resources and manpower for surveillance, data collecting and data processing.
 6. Government entities have a clear legal authority to enforce compliance measures and recall licenses.
-

An Action Plan Leading up to 2028

-
1. In the process of revising the legislation on aquaculture, attention will be paid to special regulations that govern licensing in land-based aquaculture, compared to traditional marine-cage aquaculture.

 2. In accordance with the government's fiscal plan for 2024-2028, the number of employees at the Food and Veterinary Authority involved in land-based aquaculture will be increased to 20.

 3. In accordance with the government's fiscal plan for 2024-2028, the Food and Veterinary Authority will be provided with the necessary funding for equipment to be able to undertake the monitoring of land-based aquaculture in an efficient and effective manner.

 4. Cooperation of government entities, in particular between the Food and Veterinary Authority and the Environment Agency of Iceland, will be increased, with the aim of increasing joint utilisation of manpower and resources. The Ministry of Food, Agriculture and Fisheries shall coordinate efforts to increase cooperation between all entities involved in the monitoring and regulation of land-based aquaculture.

 5. Legislation will be amended so that government entities to have a clear legal authority to enforce compliance measures and recall licenses.

 6. Work will be underway to implement a single electronic data portal for the submission of applications and forms, where applicants and license-holders can file all the relevant documentation and information, as well as monitor the progress of their applications or status of their filings. All relevant government agencies shall have access to this electronic data portal.
-

3.2 Monitoring Tailored to Land-Based Aquaculture

Animal welfare and disease prevention

The Situation in 2040

-
1. Mortality in land-based aquaculture will be in line with the best outcomes seen in neighbouring countries, both in smolt production and the production of fish for human consumption.

 2. All monitoring undertaken by government entities, private parties, and the industry itself regarding animal welfare and disease will be cohesive, risk-based and incentive-based. Government entities will have access to sufficient and appropriate resources and capabilities

to enforce their roles.

An Action Plan Leading up to 2028

1. Animal welfare rules, appropriate to land-based aquaculture, will be implemented to meet the needs of the industry.
 2. Assessments will be carried out to establish whether the standard NS9416, regarding the operations and equipment used in land-based aquaculture, should be implemented.
 3. Regulatory standards for water quality in land-based aquaculture will be updated.
 4. An assessment will be made to establish whether land-based facilities need to be dried out regularly.
 5. In accordance with the government's fiscal plan for 2024-2028, the number of employees involved in aquaculture at the Food and Veterinary Authority will be increased to 20. Part of that increased manpower will be utilized to assist in the monitoring of land-based aquaculture.
-

4.1 Robust Fundamental Research

Nature and scope of fundamental research

The Situation in 2040

1. Continuing research and licensing in new areas which may be suitable for offshore aquaculture, which includes a risk assessment of genetic admixture and bearing capacity.
 2. Research and monitoring efforts have been implemented, which ensure that the environmental impact of offshore aquaculture is within the parameters which will be defined in the manner set out in the section on traditional marine-cage aquaculture.
 3. Ongoing cooperation between government entities and the private sector regarding research, with emphasis on the transparent transmission of information.
-

An Action Plan Leading up to 2028

1. A new plan will be made to undertake fundamental research in areas which may be suitable for offshore aquaculture. Conditions for the participation of private parties will be established.
 2. Following fundamental research efforts suitable areas will be analysed, keeping in mind risk assessments and bearing capacity assessments as in traditional marine-cage aquaculture.
-

3. In subsequent revisions of the risk assessment for genetic admixture, special consideration will be given to whether, and how, offshore aquaculture impacts the risk assessment.
 4. New legislation on aquaculture will provide authority for the issuing of offshore aquaculture licenses, including research licenses which may, depending on the circumstances, translate to benefits or priority in obtaining a continuation into operational licenses, once the research and development stage is concluded.
-

4.2 An Efficient Licensing Process

Climate goals and moving from fossil fuels

The Situation in 2040

1. Operating licenses have been issued for offshore aquaculture with an emphasis on sustainable production methods, where the scale of operations is driven by the environmental impact.
 2. Legislation and taxation of offshore aquaculture factors in the different conditions of offshore aquaculture compared to other sectors of aquaculture.
-

An Action Plan Leading up to 2028

1. New legislation on offshore aquaculture will be implemented, based on goals for environmental preservation and sustainability.
 2. No operating licenses for offshore aquaculture will be issued until sufficient research has been carried out.
 3. A policy will be established regarding the zoning of ocean areas in accordance with the framework set out in the legislation for the zoning of coastal and ocean areas.
-

5.1 Robust Fundamental Research

Nature and scope of fundamental research

The Situation in 2040

1. The cultivation of algae has made its mark as an industry with sound footing and steady growth, both in terms of yield and value creation.
-

-
2. Advancements in the cultivation of micro-algae continue, but the involvement of the government is dictated by the environmental and societal impact of the industry.
-
3. Legislation considers the different requirements of micro-algae cultivation and macro-algae cultivation.
-

An Action Plan Leading up to 2028

1. New legislation concerning the cultivation of macro-algae will be implemented, based on goals for environmental preservation and sustainability.
-
2. New legislation will address the obligation to conduct research into macro-algae cultivation and the issuing of temporary research and development licenses which shall be advertised or auctioned publicly. Prior to licensing, the cultivation of macro-algae shall be subject to registration. The requirement of registration involves the obligation to register production yields, species of algae used in the production, as well as the production methods utilised.
-
3. Micro-algae production will be subject to registration, but no specific operating license will be required beyond the general licenses required to obtain permits relating to food, health, and safety. The requirement for registration involves the obligation to register production yields, species of algae used in the production, as well as the production methods utilised.
-
4. An analysis will be prepared for both industries regarding basic production inputs, such as hot water and energy, with the aim of understanding the predictability of these basic inputs and thereby support the continued growth of the industry.
-
5. Research into the feasibility of using algae in fish feed and utilising comprehensive aquaculture systems to lessen the impact of waste and excess feed from fish farming will be increased. The findings of such research could reveal opportunities for collateral growth and development of the industries.
-

5.2 An Efficient Licensing Process

Licensing to support research

The Situation in 2040

1. Areas for the growing of macro-algae have been defined and the sustainable growth of the industry has been ensured.
-

An Action Plan Leading up to 2028

1. New legislation will be implemented regarding the cultivation of macro-algae, based on goals for environmental preservation and sustainability.

2. New legislation will address the obligation to conduct research into macro-algae cultivation and the issuing of temporary research and development licenses which shall be advertised or auctioned publicly. Prior to licensing, the cultivation of macro-algae shall be subject to registration. The requirement of registration involves the obligation to register production yields, species of algae used in the production, as well as production methods utilised.

3. Areas for the development of and research into macro-algae aquaculture have been defined and delineated, taking into account the risk assessment and bearing capacity assessment performed by the Marine and Freshwater Research Institute.

4. Zoning plans for coastal areas will be prepared, or amended, for the areas which are deemed feasible for the cultivation of macro-algae.
