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The development of aquaculture: a major challenge for food sovereignty

Executive summary by François BAYROU, Haut-commissaire au Plan

Along with fruit and vegetables, seafood, fisheries and aquaculture products (fish farming, shellfish farming, seaweed farming, both in the marine environment and on land) constitute in France a category with a considerable, structural and worsening trade deficit (- €4.6 billion in 2021, - €5.7 billion in 2022). Regarding "Atlantic salmon" alone, a species much consumed by French people, our trade deficit exceeds one billion euros. French production of aquatic products covers less than a third of national consumption, thanks to the specific contribution of the fishing industry. However, especially in view of climate change and of the difficulties associated with overfishing, reducing our trade deficit concerning aquatic resources requires the development of a structured and, integrated aquaculture industry (marine and inland) that is adapted to the future impacts of climate change. Although, as with any human activity, the environmental consequences of aquaculture activities are not neutral, they appear to be better adapted to the future impacts of climate change and even include positive externalities and "ecosystem services".

To date, French aquaculture alone (just over 190,000 tons for all sectors combined in 2020) covers only 8.7% of national needs. France's share of global aquaculture production therefore remains anecdotal, whereas aquaculture, largely dominated by Asia and especially by China, has been growing at an average rate of 6.7% per year since the early 1990s. Aquaculture production has outstripped fish production for human consumption since the mid-2000s, and it will overtake total fishery production this year, in 2023. By 2032, aquaculture will account for 55% of global fish supply according to the FAO/OECD.

France has a great potential in this sector, but there are still obstacles that hinder the development of domestic aquaculture:

- **low social acceptability**, which often stems from distorted ideas about aquaculture that focus on the industrial fish farms with a strong environmental footprint; from land-use conflicts with other activities that are sometimes more lucrative such as tourism; and from a general lack of understanding of the manner in which production takes place.

- **a particularly complex administrative and regulatory framework**, which discourages many project developers. There exists a large number of intertwined standards and an institutional architecture that is difficult to understand, because responsibilities are shared by several ministries, decentralised departments and local authorities.

Yet France has a number of assets that will enable us to develop all aspects of the aquaculture industry:

- **Natural advantages**: the richness and geographical diversity of France's territory make our country unique in the world. France possesses three coastlines (Mediterranean Sea, Atlantic Ocean, English Channel/North Sea), an exceptional hydrography (more than 30,000 rivers, 112,000 hectares of ponds in mainland France) and overseas territories that provide us with a presence in all the oceans of the world and the second largest exclusive economic zone (EEZ) in the world, amounting to 10.2 million km2.
- **History**: France was a pioneering nation in modern aquaculture (the first industrial fish farm in Europe was set up in Huningue in the middle of the 19th century), and we still rely upon the excellence of our research, thanks in particular to public research institutions such as Inrae and Ifremer ;

- **Industrial assets**: upstream and downstream of the aquaculture sector, France can rely upon internationally recognised companies (aquaculture machinery, hatcheries, feed production, canneries and other segments of the agri-food sector) ;
- **Human resources**, notably with recognised training and skills, innovative and committed companies and excellent research laboratories.

In the light of these assets, it seems appropriate, while continuing to support the fishing industry whose activity is in fact complementary to aquaculture, to implement a wide-ranging action plan to regain our sovereignty with respect to products of aquatic origin.

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Action plan: How can France become a major aquaculture nation by 2030?

The development of aquaculture in France requires a strong commitment from the State and local authorities. Far from affecting French fisheries, the development of aquaculture activities should be complementary to this sector, which should continue to receive strong and long-term support, particularly regarding its socio-economic importance and its role in land-use planning in coastal areas. **This is the purpose of the roadmap formulated by the Haut-commissariat au Plan for metropolitan France and oversea territories.**

Zoning and species identification. It is essential to plan the development of aquaculture activities in specifically dedicated areas, with the participation and early involvement of all the relevant stakeholders. Combined with the formulation of a "territory-species matrix" (which aims at identifying the species and the areas that are most suitable for each territory and the relevant aquaculture techniques), this planning should promote production targets, ensure the protection of the environment, and provide investors with guidance.

"Turnkey" sites and technical installation kits for future fish farmers, which will provide simple, rapid and secure access to locations, both on land and at sea. Based on the model of "turnkey industrial sites", government departments will be responsible for preparing and making available aquaculture sites that have already been serviced (upstream environmental, health or town planning studies, development work -networks, access, production infrastructure-, consultation with local residents and players in the local ecosystem).

Simplification of the national administrative procedures that govern the procurement and the renewal of operating licences, as well as controls. This simplification will involve setting up a less fragmented administrative organisation. The expansion of the network of "regional aquaculture advisors" set up under the "Aquacultures d'avenir" plan will be a decisive factor both in identifying the obstacles that hinder the growth of aquaculture production in France and in providing support for project holders.

Training plan. A skills preservation and enhancement program should be based on three main pillars: strengthening existing training courses (by integrating all aquaculture production techniques, including the most innovative ones), creating new courses (particularly in the field of seaweed farming and in overseas France), and finally identifying and guiding pupils and students towards careers in aquaculture. This program will be based on a prospective study of the professions and of the human resources that are required to allow our objectives regarding the development of aquaculture to be achieved.

Towards innovation-led precision aquaculture. In order to combine production performance with environmental protection, it will be necessary to formulate a research investment strategy oriented towards mitigating the effects of climate change and improving the quantity, the quality and the variety of French aquaculture production (by resorting to genetics, digital technology and robotics). The transition from research to innovation will be a key stage in the practical implementation of new technical solutions e.g. Integrated Multi-Trophic Aquaculture, aquaponics, co-location of aquaculture activities and renewable energy production.