



# Enhancing Disease Resistance in European Aquaculture through Genomic Research

## Executive Summary:

The rapid growth of the aquaculture sector in Europe has brought about concerns related to sustainability, environmental impact, and, most importantly, disease management. Disease outbreaks have significant economic and sustainability implications. Genomic research, particularly through AQUA-FAANG, has paved the way for solutions that can revolutionize disease resistance in aquaculture. This policy brief explores the challenges, solutions, applications, and the path to accessible and affordable implementation of this technology for all breeding companies and species.

## Challenge:

- Rapid expansion of European aquaculture has heightened concerns about sustainability and disease outbreaks.
- Disease outbreaks have economic and environmental consequences.
- Measuring phenotypes for disease resistance is complex, hindering traditional selective breeding methods.

## Solutions Brought by AQUA-FAANG:

- AQUA-FAANG offers a breakthrough by integrating functional genomic data into genomic prediction models.
- Regulatory genomic regions controlling gene expression serve as primary candidates for developing desirable traits.
- Whole-genome sequencing and genetic markers have been identified to enhance disease resistance.
- A major quantitative trait locus (QTL) associated with disease resistance has been detected.

## Applications and Impact:

- Genomic research results can be applied not only to sea bass but also to other aquaculture species.
- Genomic selection techniques can enhance disease resistance and economic viability.
- The major QTL identified can help design new SNP panels, simplifying the selection of resistant animals for breeding companies.
- Functional annotation data helps select variants with direct effects on proteins, improving prediction accuracy of breeding programs.

## Accessibility and Affordability:

- Collaboration between research institutes and industry partners is essential.
- Structured financial support is required to develop projects like AQUA-FAANG further.
- Efficient data handling and interpretation tools need to be accessible to all breeding companies.
- Regulatory approval processes for genomic technologies must be streamlined.

In conclusion, AQUA-FAANG's genomic research holds the potential to transform European aquaculture by enhancing disease resistance and overall sustainability. Collaboration and financial support are vital to make these advancements accessible to all breeding companies and aquaculture species. Embracing genomic research is key to a more sustainable and competitive future for European aquaculture.



The AQUA-FAANG project has received funding from the European Union's Horizon 2020 research and innovation program under Grant Agreement No 817923. This publication reflects the views only of the author, and the European Union cannot be held responsible for any use which maybe made of the information contained therein.