



# Baltic MUPPETS



# DELIVERABLE 1.4

## LIST OF REMAINING BOTTLENECKS



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## 1. INTRODUCTION

Baltic MUPPETS is a three-year project supported by the Interregional Innovation Investment (I3) instrument. The project aims to create a new value chain for small Baltic Sea blue mussels by developing nutritious and high-quality pet food products. It focuses on investing in innovative techniques for underwater cultivation, harvesting and processing of the Baltic Sea's native blue mussel. This initiative is expected to support local economic development and increase quality employment opportunities. In addition, mussel farming is expected to provide several ecosystem services such as nutrient removal, water quality improvement and biodiversity enhancement. Baltic MUPPETS is a follow-up of the [BalticBlueGrowth \(BBG\) project](#), and support for farmers can also be found in the BBG reports.

This document is part of the project's Work Package 1: Prepare market and sustainable businesses for scale-up. It describes the major bottlenecks that restrain the implementation and upscaling of mussel farming in the Baltic Sea. Constraints basically fall into one (or several) of the following categories:

1. Technical shortcomings in the production process.
2. Economic competitiveness with alternative products.
3. Legislation and permission issues.

The following list will indicate the most urgent bottlenecks that need to be resolved to increase the significance of farming of blue mussels and improve the water quality in the Baltic Sea. The list also shows the presently most promising improvement measures, as well as the estimated time and costs for installation. The last column indicates the assumed progress of the proposed improvement measures for the respective constraint.

## 2. BOTTLENECKS FOR MUSSEL PRODUCTION

Table 1: Bottlenecks for mussel production.

Bottleneck	Solution	Duration of installation	Costs (€)	TRL movement
Ice damage to farm	Lowering/submerged system	~ 2 years	45,000	6 => 8
Eider duck predation	Eider fence	3 months	50,000	7 => 9
Farming costs high	Upscaling, smart farming, cooperation of farmers	~ 2 years	Depending on production volume and depreciation: 1.1 €/kg for 40 t/y, 0.53€/kg for 244 t/y	7 => 9
Reliability of production	Cooperation of several farms to reduce risks	Depending on marginal conditions	Costs relatively low	n.a.
Ice damage to farm	Lowering/submerged system	~ 2 years	45,000	6 => 8

### 3. BOTTLENECKS FOR PRODUCT DEVELOPMENT

Table 2: Bottlenecks for product development.

Product	Bottleneck	Solution	Duration of installation	Costs (€)	TRL movement
Mussel meat	Shell separation is time and money consuming	Cost-efficient shell separation by improved machinery, upscaling	6 – 12 months	100,000	5 => 8
Dog food	Costs too high	Modify recipe by adding less costly ingredients, define and communicate health benefits	~ 1-2 years	Mainly salaries	6 => 8
Cat food	Acceptance (taste)	Identify appetizers, improve recipe, define and communicate health benefits	~ 1-2 years	Mainly salaries (18 mm)	3 => 7
Ornamental fish food (mussel meal)	Price! Competition with (cheaper) fish meal	A good marketing is required to justify the higher (than fish meal) price	Product available, upscaling required	Up to 10 tons available, larger amounts in 1 – 2 years	6 => 9
Pond fish food (hobby)	Presently lack of public awareness	Develop recipe, improve composition of ingredients, define health claims, Marketing concept	2 years	Mainly salaries (24 mm)	3 => 7
Chicken food (hobby)	Price too high	Develop recipe, improve composition of	2 years	Mainly salaries (24 mm)	2 => 9

		ingredients, Marketing concept			
Ground shells for chicken food additive		Analysis of ingredients, marketing concept	0.5 – 1 year	Mainly salaries (12 mm)	5 => 9
Fertilizer	Price	Improve composition, define claims, marketing	1 year	Mainly salaries (12 mm)	5 => 9
Shells for soil improvement	Potentially high price	Define claims, marketing	0.5 – 1 year	Mainly salaries (12 mm)	5 => 9

#### 4. OTHER BOTTLENECKS

Table 3: Other bottlenecks.

Type	Bottleneck	Solution	Duration of installation	Costs (€)
Permissions	Very lengthy process		~ 1-2 years	Mainly salaries (24 mm)
Public acceptance	Lack of public acceptance	Submerge farms, information events, followed by continuous communication	0.5 years	Mainly salaries (6 mm)
Environmental certification scheme	Does not exist presently. Instalment requires political will.	Develop environmental certification scheme (nutrient reduction, CO2 fixation). Lobbying required!	Probably many years	Incalculable

## 5. CONCLUSION

A major hurdle is the time-consuming process to obtain permission for mussel farms. This process can take several years and will be followed by at least one more year for tests of environmental disturbances and food security. This lengthy process poses an almost insurmountable obstacle for investors. Political influence

Technical problems are resolvable within a time frame of approximately 2 years, but can be quite costly. The most important ones are improving the resilience of the farm against sea ice and predating birds, upscaling of farms, conversion of long line farms to smart farms, and setting up processing facilities

Mussel-based products can replace conventional products in many cases, but tend to be positioned in a higher price range. If only addressing the environmentally aware and well-funded clientele will render mussel-based products in a niche position, which contradicts the idea of large-scale mussel farming and hence water quality improvement. Upscaling reduces costs and increases profitability.

There is presently no reward for the ecosystem service a mussel farm provides, nor is any scheme of that kind foreseeable. This is regrettable, and political influence should be directed in this direction. Compensation schemes for landscape conservation for pasturing by sheep can be used as an example.