How can the aquaculture sector contribute to reducing marine litter in the Baltic Sea?

Aquaculture is the fastest growing food-producing sector in Europe, with an annual expansion rate of 8% in the last three decades. With this growth rate, there is **an opportunity for such a booming industry to act as a precursor on fighting marine litter** by reflecting on preventive measures and innovative solutions on how to manage the non-organic waste, which could become exemplary and point out the path for other sectors.

Therefore, the AQUA-LIT project is developing a toolbox of solutions for preventing, reducing, removing and recycling non-organic waste that the aquaculture industry would be able to implement.

BALTIC SEA CONTEXT

In the Baltic Sea fed aquaculture (fish) is not so prominent given the eutrophication increase concerns, and farmed fish production is more relying on land RAS (recirculating aquaculture systems). For example, to date there is one mussel farm in the German Baltic (Kiele Meeresfarm) and up to three fish farms with low profitability and unlikely future.

The extractive aquaculture is gaining traction in the Baltic sea and multiple mussel farms can be identified along the Baltic coast. The main technology used is the longline. Nevertheless, the seaweed farming as well as the Integrated Multi-tropic-aquaculture (IMTA) are also being increasingly explored. In the Baltic, it is difficult to locate the farms as these are moving often. Thus, the data point location in the map is usually a location of the company office rather than the farm itself. It is thus unclear how monitoring and assessment can be conducted or how traceable is potential litter from these farms.

Extractive aquaculture (shellfish and seaweed) sector is gaining traction across the EU, with a wide range of commercial applications going beyond human consumption (e.g. poultry and fish feed, biofuel, chemistry, pharmaceutcals, etc.). According to FAO[1], *Mytilus edulis* (Atlantic, North and Baltic Sea coasts) is one of the two core mussels species of European production. There are three different culture techniques - using poles (“bouchot”), suspended ropes or bottom culture

The intra-European exchange of information and collaboration among institutions has been strong in the region. There is an emerging importance of producer organizations to provide members with information, as well as acting as fora to develop common policies on a wide range of issues. On the local level, there are initiatives organised by the **local authorities, such as for example the ghost (net) fishing project in Sweden.**

[1] Idem.

PREVENTION & REDUCTION OF MARINE LITTER

Each country in the Baltic Sea has strict rules to be followed to make sure that there is no litter ending up in the environment; starting with noise covering electromagnetic waves and ending with toxins, plastic and any chemicals, metals or medication that may leak into the water.

EXAMPLE:
Germany has so far only one mussel & seaweed farm which is family owned and located in Kiel. The farmer tries not to produce any litter – he uses reusable mussel collectors and does not use disposable mussel socks any more. In Germany those installing the farm are not allowed to leave any litter behind. Aquaculture business is considered as any other industry when it comes to disposal of broken parts or dismantled units: the aquaculture related industrial waste is not to be disposed as a general garbage (except for those elements particularly permitted).

MONITORING & QUANTIFICATION OF NON-ORGANIC LITTER

In general, as in other EU coastal Member States, monitoring needs to be done in regard to WFD chemical (12 nm from baseline) and ecological (1 nm from baseline) status of coastal waters.

The HELCOM database in the Baltic Sea contains fishing and aquaculture litter items which have been used in the AquaLit project to produce the maps.

REMOVAL & RECYCLING OF NON-ORGANIC LITTER

Commonly farmers have their own disposal/waste collection procedures on their property and – from time to time – this will have to be disposed of in an approved manner which follows the common regulations to be adhered to by most other industry. The recycling regulation also applies for specific materials such as paper, glass, cloth, and several other materials (depends on the region).

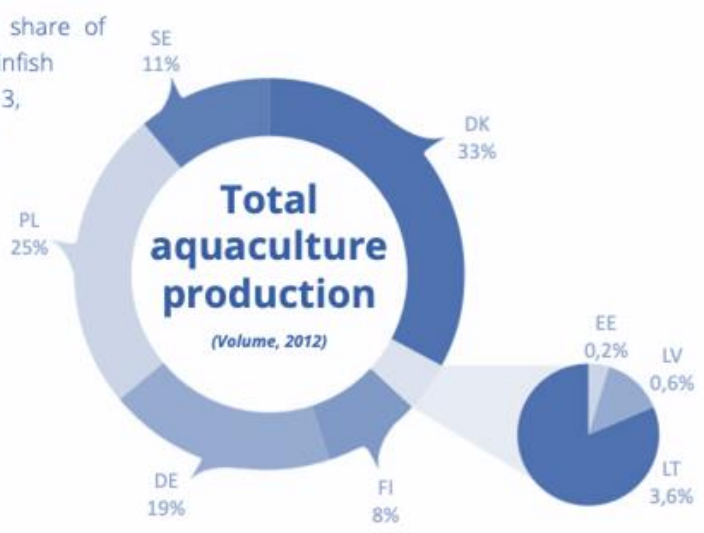
Developers usually have to think of the waste management and dismantling process, already at the project application stage - before they get the permission. In Germany for example, there are very clear obligations stated in the aquaculture framing permission. All the installations and equipment need to be removed completely - everything that was brought in the water, build or put in the place, has to be removed to leave the area in the same state as it was before the farm. If there are doubts that you do not adhere to the permissions obligations you will not get a permission in Germany. Aquaculture systems will have to obtain a licence to operate and in most of the “Länder” there are various licencing procedure in place requires everyone to follow general waste disposal and recycling laws.

One of the suggestions is that aquaculture should not be singled out as an industry that needs special regulations when it comes to waste material (non-biological, construction, equipment, etc). There are many other small-scale industries with similar materials appearing from time to time or regularly as

wastes, so disposal and recycling should be linked up, not to be costly only for the aquaculture (i.e. economies of scale). This would make the logistics for handling wastes more attractive for specialized companies.

Certainly, with the growth of the industry it would be advisable to have the aquaculture specific non-biological waste disposal and material recycling systems in place (i.e. standards, solutions and procedures). Thus, a viable solution might be in coupling together different small-scale industries which use the same type of materials; e.g. aquaculture combined with fishing or agriculture – so that a larger amount of waste (i.e. same material) may be collected. This way a critical mass of such material may be reached to then be collected and processed by recycling companies, thereby gaining an incentive to develop procedures. This would create a win-win situation as very small amounts occurring in irregular intervals require costly logistics and individual farmers may – despite tight regulations – be unable to afford the costly disposal and seek quietly illegal routes of disposal. Standards for material and equipment (including for some the lifetime limit or no-use conditions) in other industries are there already.

Baltic aquaculture accounts for a significant share of the total European aquaculture output of finfish species. However, in the period 2009–2013, the aquaculture industry slowed down. The sector makes the most of its technological developments, innovation, and synergies with other sectors, such as tourism, traditional fisheries, and co-location with offshore wind farms. Recently, recirculating aquaculture systems have become more common, encouraging concentration on more valuable species.



WHAT ARE THE KEY ISSUES / CHALLENGES?

POLITICAL

The Baltic Sea has seen a variety of changes in the aquaculture regulation across the countries, which to a certain extent reflects the high-level political support for the sector, or the lack of it. The status widely differs across the countries.

ECONOMIC

The commercial readiness of the sector differs across the countries in the Baltic Sea. In general the marine aquaculture is still a small scale and developing sector in the Baltic Sea mainly focusing on the extractive species.

SOCIAL/CULTURAL

While some countries have aquaculture as a traditional activity (sea gardens in Denmark) some others are just initiating some first businesses (Germany).

TECHNOLOGICAL

The Baltic Sea has seen many projects and initiatives focusing on the Integrated Multi Trophic Aquaculture (IMTA) and Recirculating Aquaculture Systems (RAS) (on land).

LEGAL

The regulation differs widely across the countries depending among other on the number of authorities involved in the licensing process and proximity to the shore.

ENVIRONMENTAL

Baltic Sea in general has concerns about the eutrophication, thus not all types of aquaculture are perceived the same. Thus, IMTA is seen as a viable option and there are also projects looking at the ability of mussels and seaweed to combat eutrophication and climate change (i.e. natural CO2 sequestration).

WHO ARE THE STAKEHOLDERS INVOLVED?

1. Aquaculture farmers (fish, shellfish, seaweed)
2. Equipment manufacturers (e.g. of aquaculture material & gear)
3. Engineering, system design and construction companies
4. Academic research groups
5. Professional clusters, associations and platform representatives
6. NGOs
7. Governance (including policy makers & implementers, and port staff)
8. Classification and certification bodies
9. Companies processing waste (including waste recycling and incineration)
10. Communicators (media, press, science communicators)

TRIGGERING QUESTIONS

1 – How can the aquaculture industry be more effective in preventing and reducing its non-organic waste?

- What are the barriers to preventing and reducing the loss, damage or discard of gear and other equipment in the aquaculture sector?
- What are the (technical) innovative solutions, business models and (policy) measures to prevent or reduce the loss, damage or discard of gear and other equipment in the aquaculture sector?

2 - How can the aquaculture sector be more effective in monitoring and quantifying its non-organic waste?

- What are the monitoring systems for non-organic waste quantification that you have applied in your activity or that you know of?
- What monitoring measures and schemes should be introduced, improved or enforced to encourage and empower every stakeholder to tackle the issue efficiently?

3 - How can the aquaculture sector be more effective in removing and recycling its non-organic waste?

- What are the barriers to removal and recycling of gear and other equipment that is damaged, discarded or lost?
- What are innovative solutions and business models that can be used to remove or recycle the gear and other equipment that is damaged, discarded or lost?