



FishNoWaste

Waste reduction and management in fishing ports
of the Adriatic Sea to promote sustainable fisheries

D.4.1.1. EXPERIENCE EXCHANGE AND PILOT DESIGN

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1. Introduction

This report compares and discusses the current experiences regarding fishery related waste management in Italy and Croatia, with focus on the northern-central Adriatic Sea, highlighting barriers and enablers towards sustainability, and also proposes a first set of potential pilot activities to be implemented in the FishNoWaste project target areas based on the good practices identified in the project. These experiences and knowledge were gathered through the collection and analysis of literature, policies and the information provided and shared during meetings of the project staff and stakeholders and of the FishNoWaste Advisory Board. In the context of these meetings various researchers, representatives of local and national authorities, stakeholders and policy experts discussed and compared past and current waste management solutions in fishing ports. A particular attention was posed on the factors, mostly governance related but also economical and technical, that promote (enablers) or prevent (barriers) the implementation of effective and sustainable practices in the management of fishing waste. Through this process, a first set of proposals for potential pilot activities to be implemented in FishNoWaste fishing ports were also developed. In this context, it is worth noting the relevance of EU Directive 2019/883, which establishes requirements for port reception facilities to ensure the effective management of waste delivered by ships, with the goal of reducing marine pollution. While this directive has been formally transposed into national legislation in both Italy and Croatia, its practical implementation remains inconsistent: several ports have drafted waste management plans that are only partially enforced or remain inactive. The FishNoWaste project aims to fill this implementation gap by translating policy into concrete, operational solutions built around the daily experiences of fishers, port workers and fish market operators. The proposals outlined in this report, such as the creation of ecological islands and the transition to reusable plastic fish crates, are rooted in real needs identified through participatory processes and aim to support more sustainable and compliant waste management practices in Adriatic ports.



2. Comparative analysis

2.1 Technical differences

To reach a shared set of policies and trans-border management strategy a key step is the comparative analysis of the actions and strategies in place in the two project countries - Italy and Croatia - and of the different needs and situations to be addressed in the project sites.

One of the main differences between Italian and Croatian fisheries in the northern-central Adriatic Sea is the scale: Italian fishing ports present some of the biggest fleets in the Mediterranean, especially in the northern Adriatic, while in Croatia fisheries generally present a limited number of vessels with, typically, an overall lower productivity and, often, the utilization of different gears. Also, Italian ports are often positioned close to other sources of important anthropogenic impacts beyond fishing such as industrial or highly touristic areas. Differences between fishing ports within the same nation also need to be taken into account: the Chioggia and Rimini fishing ports are not perfect but can be considered virtuous examples compared to other Italian ports regarding environmental and waste management issues. The Italian situation is indeed heterogeneous with the ports along the Adriatic coast presenting a plethora of problems, different in nature and intensity.

The routes of the fishing vessels also represent a significant difference between the Italian and Croatian situations: in smaller Croatian ports, such as Brižine, vessels do not always return back to the starting port and often spend multiple nights in other ports. This tendency introduces additional complexity regarding the management of fishing waste: these vessels cannot land the collected or produced waste in their 'base' port and do not have the space and possibility to store it on board for long periods of time. A specific logistic solution should be developed for these cases but this challenge could also represent a chance to spread the amount of waste across multiple ports without overloading single ones.



2.2 Governance differences

In both countries waste management plans mostly depend on the scale of the port and on the specific local authorities that manage them. In both countries the plans last three years but while in Croatia all ports have waste management strategies and are generally implementing them, in Italy these plans are not systematically implemented. This mainly local management also contributes to fragmentation in the regulation which further complicates the implementation of organic trans-national policies. Despite the existence of EU policies, their coherent implementation is prevented by the existence of too many national, regional and local institutions. In Croatia three different ministries are involved in the management of fishing waste (collected and produced) and also in Italy the situation is complex with both the Ministry for the Environment and Energetic Safety and the Ministry of Infrastructures and Transport involved at different level in the logistic, environmental and in infrastructural aspects of the issue.



3. Barriers and enablers

3.1 Barriers for the implementation of sustainable waste management strategies in fishing ports

The identified barriers for the implementation of correct waste management strategies in fishing ports include:

- Waste separation: the separation of the different materials that constitute both fished and produced (e.g. exhausted nets) waste would represent an excessive workload for fishers to be performed on board or on land, and often fishing ports do not have the facilities or personnel to carry out the whole process. Moreover, in line with Directive 2019/883, a clear operational distinction should be made between ship-generated waste (including hazardous materials such as used oils and batteries), passively fished waste (marine litter), and waste generated by port-based activities, including aquaculture residues (e.g. mussel socks, ropes, ...). Each of these waste types is subject to different management procedures, responsibilities, and funding mechanisms. However, in many ports, these distinctions are not effectively applied, leading to confusion, overlapping responsibilities, and, at times, to the absence of appropriate infrastructure for handling each category. This lack of clarity further discourages proper waste delivery and contributes to the overall inefficiency of port waste management systems.
- Processing stages: passively fished waste is also covered in salt and often by biofouling and other encrusting organisms that make it harder to recycle through existing methods.
- Lack of communication between authorities at different levels and geographical scales, promoting lack of clarity and management fragmentation.
- Scarcity of funding for smaller ports: smaller port authorities often do not have the resources (staff, funds) or the structure and facilities to implement a more sustainable waste management.



3.2 Enablers for the implementation of sustainable waste management strategies in fishing ports

The identified enablers for the implementation of correct waste management strategies in fishing ports include:

- Presence of a simple and well organized disposal chain: ports should have the resources to support fishers and the infrastructure to reduce their workload in managing waste, and promote cost-effective waste management also based on reuse/recycling.
- Better distribution of funding: the existing funds should be made available also for smaller ports together with clear and simple guidelines and sustainability goals suitable for the size of the specific port.
- A control system may be created in order to systematically check whether ports correctly apply regulations and guidelines and, potentially, enforce penalties for those that do not comply.
- All the measures should be supported through cross border cooperation and capacity building. This would strongly enhance their results in a shared basin, reducing management fragmentation and also reinforcing and encouraging the participation of fishers based on awareness raising and the virtuous example they may witness.

Enabling factors are directly linked to the effective implementation of Directive 2019/883, which calls for structured waste management plans, trained port personnel, and transparent cost-recovery systems. These mechanisms, if properly activated, can reduce uncertainty and encourage compliance, particularly regarding the separate handling of marine litter and hazardous waste.

The FishNoWaste project actively supports this process by providing practical tools, such as pilots for ecological islands and reusable fish crates, that reflect real operational needs and contribute to the environmental goals of the directive. By promoting reuse and better logistics, and by involving local stakeholders from the start, the project turns regulatory principles into applicable, everyday solutions.



4. Proposed pilot actions

From the discussion with the stakeholders and the Advisory Board meeting emerged some potential pilot actions to be tested, based on what were identified as good practices. These pilot actions have been shaped through the direct involvement of those who work daily in the port settings, such as fishers, fish market operators, and local authorities. Their contributions helped identify concrete operational gaps, especially where port waste plans are in place but not effectively enforced. The FishNoWaste project uses this bottom-up approach to translate the principles of Directive 2019/883 into feasible and replicable solutions. This direction also reflects several key points raised during the Advisory Board meeting in Tribunj, where the need for real-world tools to support compliance and efficiency was strongly emphasized. It will be crucial to couple all project pilot actions with training activities, as foreseen in FishNoWaste, aimed at awareness raising and capacity building among fishery related stakeholders (e.g. fishers, fish markets).

One potential solution is the centralization of waste storage, collection and processing, potentially making waste management more cost-efficient and so self-sustainable, and simplifying fishers' lives through the presence of dedicated spaces inside ports (e.g. this would be particularly needed in Chioggia) that would allow them to dispose of caught and produced waste in an efficient way and with a limited added workload. Such a solution would be represented by the dedication of an area of the port to the placement of an ecological island, e.g. adjacent to the water or on a floating barge, where the fishers could land the waste directly from the boat into specific containers. In such a scenario a plan should also be developed to have at least some of the separation of the landed material performed by the port authority personnel or by the local waste management company. This solution might simplify significantly the whole waste management process and facilitate the implementation of good practices such as reuse and recycling but it would require a dedicated space inside the port and, realistically, significant initial (facilities) and regular (staff) investment, that would have to be balanced - to be sustainable - by the revenues generated by reuse and recycling of fishery related waste as well as by the public funds that should be dedicated to dispose of fished marine litter.

One second potential solution is the substitution of single use polystyrene boxes with reusable plastic crates for fish. Many fishers expressed their willingness to sustain an initial economic investment for the purchase of the boxes given that this solution may be, to them, sustainable both from an ecological and economical point of view in the long term. Reusable boxes would significantly reduce the amount of waste produced by the fishing industry while



maintaining efficiency. For this solution fishing ports should be equipped with infrastructure dedicated to the washing and storage of the boxes that should not exclusively be demanded to the fishers themselves, and the supply chain should be carefully examined and plan for the return of the boxes once they have been used. A potential issue that emerged from the fishers is that reusable plastic boxes would not be as suitable for international or long-scale commerce as they are for the local market: locating and bringing back the boxes from far away would be expensive, difficult and impactful from an ecological point of view so part of the landed produce would still be stored in polystyrene containers or alternative solutions should be sought for. Multiple companies producing reusable plastic boxes are already collaborating with the FishNoWaste project partners to design or provide solutions fit to the specific pilot ports involved.

These potential solutions are of course just examples that seem to be fit for fishing ports targeted by FishNoWaste, but they do not exclude the implementation of other alternative sustainable solutions in these or other fishing ports whose specificity should always be accounted for when examining infrastructural improvements and investments.

