



D2.5 Reward programs for fishers’ voluntary collection and management of marine litter

Report, including a policy brief, about the results of the reward program aimed to voluntary collection and management of marine litter, which was co-produced, in conjunction with key representatives from fishing communities, culturally relevant sets of proposed fishers’ reward programs and 3 generic virtual reality scenarios. Co-production of culturally sensitive best practice reward programs for fishers’ voluntary collection and management of marine litter in the study countries, and recommendations for the implementation of such strategies at a local, national and EU level. And, report of the receptiveness of fisheries regulators and EU/Mediterranean policy-makers to tackle problems of marine litter through the development of specific and effective strategies to improve existing policies and practices.



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Summary NETTAG+ Project

NETTAG+ aims to provide a portfolio of three innovative smart and sustainable solutions to address the negative impacts of abandoned, lost or otherwise discarded fishing gear (ALDFG) on marine life and habitats. NETTAG+ will be based on synergistic activities between the fisheries industry, scientists and NGOs to develop three solutions to PREVENT, AVOID and MITIGATE the harmful impacts of ALDFG.

NETTAG+ will PREVENT marine litter derived from fisheries activities, AVOID loss of fishing gears, and MITIGATE harmful impact by removing existing ALDFG. These three solutions will jointly contribute to reduce ALDFG and marine pollution, namely by: reducing the introduction of hazardous chemicals and microplastics originating from ALDFG; reducing ghost fishing, bycatch and entanglements of sensitive or endangered species on ALDFG; and improving mapping, tracking and recovery technologies to retrieve ALDFG.

NETTAG+ aims to upgrade and upscale the integrative preventive approach that started in the previous NetTag project, and aims to replicate it in Mediterranean regions, providing the fisheries industry with three smart and environmentally-friendly solutions to reduce ALDFG and prevent the environmental impacts of fishing gears. The three solutions will be developed to maturity (TRL 7-8) by the end of the project, and will be tested, validated and demonstrated in real conditions in Atlantic and Mediterranean countries, namely Portugal (PT), United Kingdom (UK), Spain (SP), Italy (IT), Croatia (HR) and Malta (MT). NETTAG+'s ambition is to change the paradigm of the fisheries industry, aspiring to transform the societal perspectives about the role of fishers as Guardians and Cleaners of the Ocean. NETTAG+ will empower the sector to take effective actions to address marine pollution, promoting their role as key actors to tackle marine pollution.

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Executive Summary

Marine litter remains a significant environmental and socio-economic challenge across European seas. Addressing these impacts requires solutions that are not only environmentally effective but also socially acceptable, economically viable, and institutionally feasible. Within this context, Deliverable D2.5 of the NETTAG+ project explores reward-based approaches to support fishers' voluntary collection and management of marine litter passively retrieved from the Ocean, alongside the use of virtual reality (VR) as an engagement and awareness-raising tool.

The deliverable reports on a co-produced process involving fishers, port authorities, fishing association managers, fisheries regulators, and policymakers in Croatia, Italy, Malta, Portugal, and Spain. Through workshops, interviews, and immersive VR experiences, the study examined preferences for different reward mechanisms, perceived challenges and enabling conditions, and the receptiveness of regulatory and policy actors. The analysis focuses on issues of fairness, motivation, practicality, and governance, rather than prescribing a single optimal solution.

Findings indicate broad support for incentive-based rewards program, particularly those that reduce key operating costs or provide compensation proportional to effort. However, stakeholders consistently underline the need for stable funding, adequate port infrastructure, clear institutional responsibilities, and simple administrative procedures. Policymakers and regulators show openness to reward programs, emphasizing alignment with existing legal frameworks, avoidance of unintended effects, and integration within broader marine litter and fisheries policies. The VR component proved effective in increasing awareness regarding marine litter, improving perceptions of fishers, and strengthening motivation to act across diverse stakeholder groups, both within and beyond the fishing sector, highlighting its value as a complementary communication and co-creation tool.

Overall, Deliverable D2.5 provides exploratory, evidence-based insights to inform the design and future testing of context-sensitive reward programs and engagement strategies aimed at reducing marine litter and reinforcing fishers' role as active stewards of the marine environment. These findings provide actionable guidance for the design of scalable, policy-aligned reward schemes, contributing to EU objectives on marine litter reduction and supporting the transition towards more sustainable and socially engaged fisheries. This work culminated in the development of a policy-oriented white paper.

1 Introduction

Marine litter represent a persistent environmental, ecological, and socio-economic challenge across European seas. These materials contribute to ghost fishing, habitat degradation, entanglement of protected species, and the release of microplastics and hazardous substances, while also imposing additional operational and economic burdens on fishers and port infrastructures. Addressing marine litter from fisheries therefore requires solutions that combine effective environmental action with social acceptability, economic realism, and institutional feasibility.

The NETTAG+ project (“Preventing, Avoiding and Mitigating Environmental Impacts of Fishing Gears and Associated Marine Litter”) aims to respond to these challenges by developing, testing, and demonstrating a portfolio of innovative and sustainable solutions to **prevent**, **avoid**, and **mitigate** the impacts of fishing gear related marine litter. Building on synergies between the fisheries sector, scientists, policymakers, and civil society actors, NETTAG+ seeks not only to reduce ALDFG and marine pollution, but also to support a broader shift in societal perceptions by recognizing fishers as key actors—and potential guardians—in the protection and restoration of marine ecosystems.

Within this framework, Work Package 2 focuses on understanding social, institutional, and behavioral dimensions that influence the uptake of solutions by the fishing sector. Deliverable **D2.5** contributes to this objective by exploring **reward-based approaches** aimed at supporting the **voluntary collection and management of marine litter by fishers** and promoting their role as cleaners of the ocean, alongside innovative communication and engagement tools. This deliverable presents the results of a study exploring culturally relevant sets of proposed reward mechanisms for fishers, focusing specifically on how different **key representatives from fishing communities** perceive various potential incentive mechanisms, and **three generic virtual reality (VR) scenarios** developed to enhance awareness, empathy, and dialogue around marine litter challenges and solutions.

Specifically, D2.5 reports on a structured policy co-design process involving fishers, port authorities, managers of fishing associations, fisheries regulators, and policymakers at national and EU levels. Through interviews, participatory workshops, and VR-supported engagement activities conducted in NETTAG+ study countries (Croatia, Italy, Malta, Portugal, and Spain), the deliverable examines stakeholders’ preferences regarding different reward incentives—such as fuel related subsidies, port fee reductions, payments linked to the quantity of litter delivered,

recognition schemes, or payment by waste management companies. The focus is placed on understanding perceptions of **fairness, practicality, motivation, and governance requirements**, rather than on prescribing a single optimal solution.

In addition to documenting stakeholder preferences, this deliverable assesses the **receptiveness of fisheries regulators and EU policymakers** to the implementation of reward-based strategies for marine litter management. Particular attention is given to identifying perceived opportunities, constraints, and potential unintended effects, as well as to clarifying the roles of different actors in funding, designing, implementing, and monitoring such programs. The analysis supports the formulation of **recommendations for the implementation of reward programs at local, national, and EU levels**.

A distinctive feature of D2.5 is the integration of a **Virtual Reality (VR) experience** as both a communication and research tool. The VR component consists of an immersive experience onboard a fishing vessel informed by three scenarios—a depiction of current conditions, a business-as-usual future, and a future shaped by the adoption of NETTAG+ solutions—developed using scientific evidence and stakeholder input. By combining immersive storytelling with pre- and post-exposure empathy questionnaires, the VR experience enables the assessment of changes in user awareness, social perceptions of fishers, and motivation to engage in marine litter mitigation across different stakeholder groups, including the general public.

Overall, Deliverable D2.5 provides evidence-based insights into how **culturally sensitive, incentive-based reward programs**, supported by innovative engagement tools such as virtual reality, may contribute to rewarding fishers for their voluntary service when collecting and managing litter that is passively retrieved by their fishing gear. Rather than offering prescriptive solutions, the deliverable highlights shared trends, country specific differences, and governance considerations that can inform future policy development, pilot testing, and scaling up of reward-based strategies within European fisheries and marine litter policy frameworks. In doing so, this deliverable contributes to bridging the gap between exploratory pilot actions and policy-ready solutions, offering insights that are directly relevant for future implementation under EU marine, fisheries, and circular economy frameworks.

1.1 Purpose and scope

The purpose of Deliverable **D2.5** is to report from the outcomes of a study on the design, implementation, and outcomes of a future **pilot Fishers' Reward Program** aimed at supporting the **voluntary collection and management of marine litter**, as developed within the NETTAG+ project. The deliverable documents a co-production process carried out with key representatives from fishing communities and governance actors, resulting in culturally relevant sets of proposed reward mechanisms and the assessment of their acceptability across different stakeholder groups.

The scope of this deliverable includes: (i) the identification and qualitative evaluation of potential reward mechanisms for fishers; (ii) the analysis of stakeholder preferences, perceived challenges, and enabling conditions for implementation; (iii) an assessment of the receptiveness of fisheries regulators and EU level policymakers; and (iv) the presentation of three generic virtual reality scenarios designed to support awareness raising, empathy, and dialogue on marine litter and mitigation strategies.

The findings are based on a **small-scale set of interviews** conducted in selected countries and are therefore not intended to be statistically representative of the broader populations involved. Instead, the deliverable provides exploratory insights and **context-sensitive recommendations** to inform future policy development and further testing at local, national, and EU levels.

While this deliverable addresses the requirement to report results in a policy-brief-oriented format, the richness and diversity of qualitative evidence generated through interviews and co-design activities required a more extended narrative to avoid oversimplification and retain country- and stakeholder-specific insights. For this reason, results are presented in a white-paper format, while maintaining clear policy relevance.

2 Methodology

2.1 Incentives for a pilot Fishers Reward Program

First, an international literature review was conducted to identify the types of litter reward programs that have been trialled and the incentives used to reward the collection of marine litter. Within this project, a reward program is defined as an instrument that provides incentives, aiming to encourage fishers to collect marine litter and return it to port where it is weighed and classified. The fisher then receives the corresponding amount of incentive to the amount of litter delivered. These incentives (Table 1) were then used in subsequent workshops and interviews to test stakeholder preferences in each study country to enable the development of country-specific and culturally sensitive potential reward programs.

Table 1. List of incentives obtained from the literature review.

Incentives for Fishers' Reward Program
Discounts on fishing gear purchases
Payment by waste companies
Recognition and awareness campaigns to promote participating vessels
Reduction in fish auction costs or right to first sale for participating vessels
Reduction in port fees for vessels delivering marine litter and ALDFG under the program
Subsidies on the amount of litter delivered
Subsidies or discounts on fuel for participating vessels

Between February 2025 and February 2026 in-person, semi-structured interviews were conducted with 11 managers of fishing associations, 15 port authorities, and four national fisheries regulators. In addition, workshops involving 174 fishers were organised across selected fishing ports. Participants were selected based on their active involvement in fishing activities or in environmental and port management, and with the aim of capturing a diversity of port sizes, operational characteristics, and infrastructure types. This sampling strategy ensured a grounded understanding of fishing-related waste handling and reception under a range of practical, organisational, and institutional contexts.

Furthermore, additional in-person interviews were carried out with one national policymaker in Spain and two EU-level policymakers working directly on fisheries and marine litter management in February and March 2026. The full list of participants, including their roles and anonymised codes, is provided in Table S 1 (Annex 1). The selected incentives were further assessed not only in terms of stakeholder preference but also considering their potential alignment with existing EU policy instruments and funding mechanisms.

2.2 Data collection and analysis

2.2.1 *Fishers Reward Program*

Data were collected through a structured policy co-design process involving key representatives from fishing communities and stakeholders across the fisheries and port governance system. This process aimed to ensure that the proposed measures were informed by practical experience, institutional knowledge, and policy expertise across multiple governance levels. The stakeholder groups engaged in the data collection activities included:

- Fishers
- Port Authorities
- Managers of fishing associations
- Fisheries Regulators
- Policymakers

The selection of these stakeholder groups reflects a deliberate effort to align the proposed measures with local operational realities, existing institutional capacities, and national and EU policy frameworks. By engaging actors who are directly involved in fishing activities, port operations, sector coordination, and regulatory oversight, the study captures a comprehensive and multi-level understanding of the challenges and opportunities associated with the implementation of reward-based schemes for marine litter collection. The participants were chosen across multiple locations in Croatia, Italy, Malta, Portugal, and Spain, ensuring representation of different national and operational contexts in the Atlantic Ocean and Mediterranean Sea.

Tailored questionnaires were administered to each stakeholder group—managers of fishing associations, fisheries regulators, and policymakers—ensuring that the questions reflected their respective institutional roles and decision-making responsibilities, while allowing for

comparative analysis across governance levels: fishing regulators and managers of fishing associations and policymakers.

This participatory, multi-actor approach ensures that the perspectives of fishing communities and key decision-makers are systematically incorporated into the design of the Fishers' Reward Program. As a result, the program is grounded in shared problem framing and co-ownership of solutions, which are critical conditions for enhancing social acceptability, institutional legitimacy, and long-term uptake. Moreover, the active involvement of fishers and governance actors in the identification and prioritisation of incentives strengthens the feasibility and effectiveness of the proposed measures and supports their integration into existing governance and operational structures. This mixed-methods and multi-actor design ensures methodological triangulation, increasing the robustness and validity of findings across diverse socio-institutional contexts.

Fishers: To enable the collection of insights across fleet segments operating in different cultural contexts, workshops were conducted by fishers' representative partners (APMSHM, ARVI, MAFA/ARM, WWF Med, WWF Italy) with 174 small-scale and large-scale fishers in Croatia (33), Italy (28), Malta (34), Portugal (63) and Spain (21) as part of Task 2.2 Awareness Actions. Fishers were organized into focus groups, each group was assigned an anonymous code. This specific workshop (Workshop #3) lasted approximately two hours and specifically focused on the marine litter passively collected by fishing gear, and specific exercises on the potential implementation of fishers' reward programs aimed at incentivising the collection of marine litter were included in this Workshop.

Industrial large-scale fisheries (LSF) were excluded from the rewards program. This is primarily because operating such large vessels makes it impractical to store waste onboard for weeks or months. In addition, for long-distance fleets, keeping collected litter onboard poses logistical challenges related to storage, particularly as in many cases they operate from non-EU ports or land their catches there. Moreover, marine litter is mostly concentrated in areas closer to the coast, where long-distance fleets do not operate. In the open seas, the concentration of marine litter is much lower, except in specific hotspot locations. This information is further supported by interviews conducted with LSF fishers during [NetTag](#).

The incentive options identified in the literature review were presented to fishers, who were asked in small groups to rate the importance of each incentive, identify their overall preferred incentive, provide the reasons for their preference and identify any anticipated challenges to



the implementation of the incentive as part of a fishers' reward program. The structured discussion of these options facilitated the identification of key enabling and constraining factors influencing the potential uptake of fishers' reward programs across different contexts. Data obtained from the results can be found in [Campogianni et al. \(2026\)](#).

Port authorities: Fifteen semi-structured interviews were conducted by University of Aveiro (UAveiro) and fishers' representative partners (MAFA/ARM, WWF Adria, WWF Med and WWF Italy) with port authorities (Task 2.3) representing small, medium, and large ports in the five study countries. This diversity enabled the collection of insights across different port typologies and political contexts. Port authorities were asked about the existence of a fishers' reward program in their port, the conditions that should be in place for the port to consider implementing or participating in a rewards program, overall preference among incentives identified in the literature review, reasons for their choice and feasibility of implementation at their port, important types of stakeholders that should participate in a program, main challenges to implementation and requirements to mitigate these challenges, and what would be required to ensure fishers' participation in reward programs in general, over time. Interviews lasted approximately 60 minutes. Also see the [deliverable report D2.2](#), [policy brief](#) and [scientific article](#) for the main findings and recommendations.

Managers of fishing associations and fisheries regulators: Semi-structured interviews were conducted by USC, UAveiro and, due to language barriers by local partners in Croatia (WWF Adria), Italy (WWF Italy) and Malta (MAFA/ARM), with 11 managers of fishing associations and four fisheries regulators in the five study countries. The objective was to identify their overall preference among incentives identified in the literature review, reasons for their choice and feasibility of implementation at their port, important types of stakeholders that should participate in a program, who should fund, design, implement and monitor the program, main challenges to implementation and requirements to mitigate these challenges and whether they see incentives programs as a long-term solution to managing marine litter at fishing ports. Interviews lasted approximately 30 minutes and can be seen in [Ainsworth et al. \(2026\)](#).

Policymakers: These stakeholders were presented with the two most frequently preferred incentives by fishers and port authorities in all countries combined and were invited to comment on these results. This approach enabled an assessment of their receptiveness to the implementation of a fishers' reward program, as well as their views on the alignment of certain incentive preferences with existing regulatory frameworks, policy objectives, and administrative

capacities. Semi-structured interviews were conducted by University of Santiago (USC) with one Spanish national and two EU policymakers. The objective was to assess acceptance of the preferred incentives identified by fishers and port authorities, and to explore their perceptions regarding the governance, funding and implementation of a rewards program; challenges, sustainability and policy implications; feasibility of implementing fishers' and port authorities' two most frequently preferred incentives; their own preferred incentive overall; challenges, advantages and disadvantages of the preferred incentive; and suggested policy amendments to improve waste management in fishing ports. Conducted interviews for policymakers are also shown in [Ainsworth et al. \(2026\)](#).

Interview questions used for all stakeholder consultations in the fisheries sector on a Fisher's Reward Program for marine litter collection, and the sources of information used to assess the variables "Best Practice," "Receptiveness of fisheries regulators and EU policymakers," and "Recommendations," are presented in Table S 2 (Annex 2).

Best practice reward programs

Best practice reward programs these were identified by analysing quantitative and qualitative data derived from the fishers' workshops and semi-structured interviews regarding their preferred incentive and perceptions about participation and feasibility of implementation (Table S2). It should be noted that the best practices presented in this deliverable (see Section 3.1 Best practice for the implementation of a pilot Fishers Reward Program) reflect the opinions and perspectives of the interview participants as derived from the qualitative analysis. These practices do not represent recommendations or positions advocated by the NETTAG+ project itself but are instead an evidence-based reflection of stakeholder views collected through the consultation process.

Receptiveness

To ensure consistency and transparency in assessing stakeholders' openness to a pilot marine litter reward program, all interview excerpts were analysed using a structured qualitative framework. Receptiveness levels (*High, Moderate, Low*) were assigned according to the explicit statements made by interviewees and the strength, clarity, and nature of their expressed support for reward-based schemes. The rating measures attitudes, intentions, and willingness to support or engage with a reward program.

The four receptiveness categories are defined as follows:

- High: stakeholders express **clear, explicit, and proactive support** for a pilot reward program. They often state that the program is *important, fair, or needed*. They also indicate strong willingness to adopt or help implement incentives, provide constructive suggestions to maximize impact and/or see rewards as beneficial for fishers and the environment.
- Moderate: stakeholders show **general openness** toward reward programs but with **notable reservations**. They may support the idea in principle but prefer certain types of incentives over others. They may also express interest but without strong conviction.
- Low: stakeholders express **little to no support** for reward programs. This may include explicit rejection of the concept, belief that rewards are unnecessary, ineffective, or inappropriate, and no willingness to engage or facilitate implementation.

For the application of the rating method, each stakeholder interview was examined for: direct quotes expressing support or skepticism; value-based arguments (fairness, responsibility, environmental benefits); conditions or caveats placed on support; and tone and strength of endorsement. This systematic approach ensures that ratings reflect attitudinal openness, not feasibility constraints.

Recommendations

For this variable, multiple responses across several interview questions were analyzed. Attention was given to: (1) proposed mitigation strategies to address potential unintended effects or trade-offs of the reward program, and (2) stakeholder perspectives on which actors should be involved in the Fishers' Reward Program. Where possible, roles were differentiated across the key phases of the program, including funding, program design, implementation, and monitoring. This analysis provides insight into perceived governance responsibilities and preferred institutional arrangements for the effective and credible operation of reward-based marine litter collection schemes.

2.2.2 *Virtual Reality scenarios*

Development of VR Experience and 3D Video

The Virtual Reality (VR) experience integrates immersive 3D video, spatial audio, and environmental storytelling, all grounded in real-world field conditions. The scenarios are carefully designed to reflect authentic maritime environments and operational contexts, ensuring both ecological and socio-economic relevance. The VR modules are intended to be used in conjunction with structured empathy questionnaires and stakeholder interviews, enabling the systematic collection of qualitative and quantitative data.

Rationale

The VR experience has been developed to achieve the following objectives:

- Demonstrate the human and ecological impacts of marine litter, particularly in relation to fishing gear interactions and entanglement scenarios.
- Translate abstract policy scenarios into tangible, experiential narratives that enhance understanding and engagement.
- Facilitate the exploration of emotional, behavioral, and policy responses to marine litter challenges.
- Increase empathy and awareness among fishers and policymakers regarding the consequences of marine litter, as well as the potential benefits of NETTAG+ solutions.
- Support the co-creation of incentive-based reward schemes for fishers engaging in voluntary marine litter collection.
- Assess the social acceptability and perceived effectiveness of different marine litter mitigation strategies.

This approach ensures that the VR experience not only serves as a communication tool but also as a participatory instrument to inform policy development and stakeholder-driven innovation.

Script development

The experience script including three marine litter scenarios (described in Table 2) was developed by an interdisciplinary team of researchers at USC with advice from the consultant [Play&Go Experince](#) which was contracted to develop the technical aspects of the experience. The script was based on robust scientific evidence, including findings from socio-economic

analyses, peer-reviewed literature on future projections, and empirical data on marine litter and further informed by insights from educational and awareness-raising activities (Tasks 2.1–2.2). This co-design approach ensured that the scenarios accurately reflect real-world operational challenges, scientific and fishers’ knowledge, stakeholder perspectives, and diverse cultural contexts across the study regions.

To ensure cross-country applicability and multi-cultural relevance, the scenarios were adapted to a common baseline situation applicable across all NETTAG+ participating countries. To maximize accessibility and inclusiveness across participating countries, the script was translated into six languages: Croatian, English, Italian, Maltese, Portuguese, and Spanish. Users can select their preferred language when entering the experience.

Table 2. Marine litter scenarios included in the VR experience.

Scenario	Description
Current Reality	Depicts present interactions between fishers and marine litter, highlighting operational and environmental burdens
Business-as-Usual Future (BAU)	Projects degradation of marine ecosystems and increased gear-litter interactions if current patterns persist
NETTAG+ Solutions Future	Visualises outcomes if preventive, avoidance, and mitigation technologies are fully implemented

In this VR experience, users are immersed on board a fishing vessel, where a captain narrates and contextualises the impacts of marine litter on both fishing activities and the marine environment supported by captions and associated images (e.g. scientific graphs). The experience then guides users to a fishing ground, where they can observe the Current Reality scenario showing the types and quantities of marine litter typically retrieved during fishing operations by looking and moving around the 360° environment. Subsequently, users are exposed to two contrasting future scenarios: (i) the ‘*Business-as-Usual Future*’ (BAU) trajectory is characterised by significantly increased levels of marine pollution based on projections from the scientific literature, and (ii) ‘*NETTAG+ Solutions Future*’: a positive alternative scenario depicting a cleaner marine environment than in the Current Reality scenario following the implementation of NETTAG+ and complementary mitigation measures (Figure 1). The 360° videos can be seen also in [Ainsworth et al. \(2026, April 28\)](#).

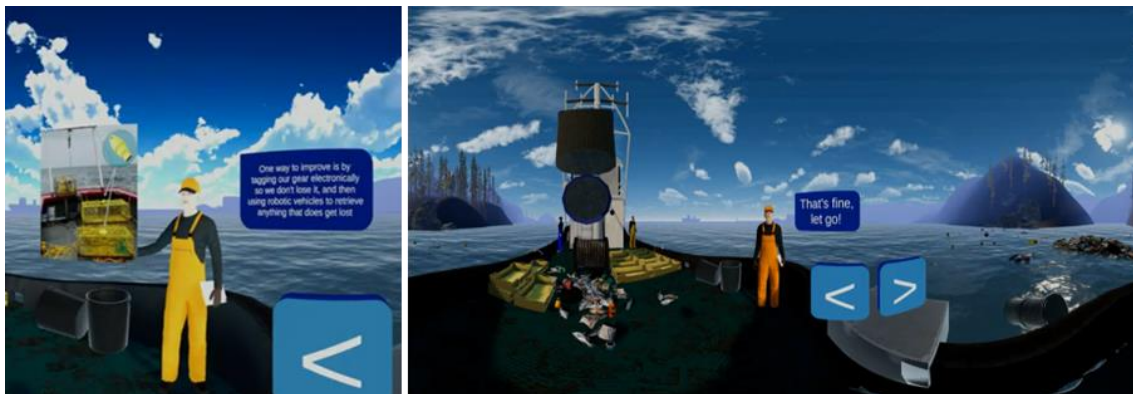


Figure 1. Snapshot of the VR experience.

Development of pre and post empathy questionnaires and data collection

The VR experience was designed to be deployed alongside structured pre- and post-empathy questionnaires ([Astudillo-Pascual et al., 2026](#)). These instruments were developed to capture emotional and cognitive shifts resulting from participating in the VR experience. Specifically, they aim to:

- Assess users' understanding of marine litter issues: Awareness and knowledge of ML (marine litter)
- Measure changes in empathy towards fishers and identify any unintended emotional or perceptual effects (e.g. potential negative shifts in perceptions of the fishing sector: Perceived public perception of fishers)
- Evaluate willingness to engage in corrective actions and participate in incentive-based reward programs. Motivation levels were measured on a 1–10 scale: Motivation to take action against ML

This combined approach enables a comprehensive evaluation of the effectiveness of immersive storytelling as a tool for awareness-raising and behavioural change.

Stakeholder feedback loops

Iterative stakeholder feedback mechanisms were established to refine both the narrative and visual components of the VR experience. For example, a pilot version of the VR activity was conducted prior to the official launch events. During this phase, the experience was tested by a group comprising scientists (CIIMAR), a representative of the fishing sector (APMSHM), and a manager of a fishing association. Their feedback informed targeted improvements to the VR

scenarios as well as to the design and clarity of the empathy questionnaires. This iterative co-design process ensured relevance, accuracy, and user appropriateness.

Organisation of launch events

Following the completion of testing and refinement phases, the VR scenarios were officially launched and demonstrated through a series of key events targeted towards a broad audience, including fishers, policymakers, fisheries stakeholders, and the general public. The demonstrations served both as dissemination activities and as opportunities for further engagement and data collection.

Measured variables

Three variables were measured through structured pre- and post-empathy questionnaires to assess the impact of the VR experience on participants' cognitive, emotional, and motivational responses to marine litter issues in the fisheries sector: (1) Awareness and knowledge of marine litter; (2) Perceived public perception of fishers; and (3) Motivation to take action against marine litter.

2.3 Ethical considerations

Ethical approval to implement the social science interviews was obtained from the University of Santiago de Compostela Bioethics Committee in December 2023 (Code USC Nº 77/2023). All participants received a project information sheet explaining their rights and signed a Consent Form before the start of the workshop or interview. To ensure that all information shared is treated in strict confidence, all data resulting from the interviews is anonymised and where possible, responses are reported cumulatively.

2.4 Limitations and reporting considerations

It should be noted that this activity constitutes an exploratory study conducted in a limited subset of countries. Consequently, the findings can only be related to the specific population of fishers and stakeholders who participated in the study and cannot be generalised to the wider fishing sector or to other national contexts. This work represents an initial exploratory step aimed at assessing the general acceptability of the introduction of a Fishers' Reward Program for the collection of marine litter across different stakeholder levels and general interest in a set of potential incentives (Table 1). Building on these initial insights, more in-depth and large-scale

studies will be required in subsequent phases to ensure full sectoral and geographical representativeness.

An additional limitation should be noted in the Italian case. One port authority (IT01) interviewed in 2025 also acted in the capacity of a fisheries regulator (IT06) and was therefore approached again in 2026 for follow-up questions. However, despite multiple attempts, it was not possible to establish contact with this stakeholder in its role as a fisheries regulator, preventing the collection of information specific to that role.

Moreover, although this deliverable responds to the requirement to report results in a policy brief oriented format, the depth and diversity of qualitative evidence generated through interviews and co-design activities warranted a more extended narrative structure. To avoid oversimplification and to preserve country- and stakeholder-specific insights, results are therefore presented in a white paper format, maintaining a clear policy focus and relevance. This white paper can be found in the annex of this deliverable (Annex 3).

3 Results

This section synthesizes stakeholder perspectives on culturally and contextually relevant reward mechanisms, identifies perceived benefits and challenges associated with their implementation, and reports on levels of institutional receptiveness. In addition, it presents results from the evaluation of three generic VR scenarios, which were developed as complementary engagement and awareness-raising tools to explore perceptions, empathy, and motivation related to marine litter and mitigation strategies.

3.1 Best practice for the implementation of a pilot Fishers Reward Program

3.1.1 Croatia

In Croatia, the most preferred incentive across stakeholder groups—selected by two port authorities, one manager of a fishers' association and 29 fishers—was **subsidies or discounts on fuel**, primarily because fuel represents the largest operational cost for vessels.

Additionally, four fishers favoured **discounts on sustainable fishing gear** recognizing its positive impact on sustainability, while two fishers' associations **supported subsidies based on the amount of litter delivered**, arguing that tangible, effort-linked rewards best motivate behaviour change. One fisheries regulator, chose **reduction in port fees**, explaining that these represent high operational costs for fishers.

Common challenges across all incentives include:

- Financial constraints to secure funding
- Insufficient port-side infrastructure
- Unclear institutional responsibilities and communication
- Risks of fraud/abuse by participants
- Weak monitoring systems

These challenges highlight the need for robust governance frameworks, transparent monitoring systems, and cross-institutional coordination mechanisms. Additionally, it was mentioned that fuel subsidies face coordination difficulties across ministries and financial dependence.

3.1.2 Italy

In Italy, **subsidies or discounts on fuel** were the most widely supported incentive, selected by 28 **fishers**, who viewed fuel support as providing the greatest direct economic benefit. Two **port authorities** favored **reductions in port fees**, considering them a realistic and motivating financial measure, one the manager of a **fishing association** supported **reductions in fish auction costs or first sale rights** as a tangible way to compensate fishers for the time and effort spent collecting marine litter. Additionally, one fisheries regulator chose **reduction in port fees** for similar reasons as those mentioned by the port authorities.

Across incentives, a common challenge mentioned was the need for robust verification systems to prevent fraud and ensure waste is genuinely collected at sea. Incentive specific challenges include complex fuel tracking due to varied engines and suppliers (fuel subsidies), the need for a clear regulatory framework (port fee reductions), and insufficient port infrastructure, such as missing containers and collection authorizations once waste reaches land (auction fee reductions).

3.1.3 Malta

Across Malta, the most preferred incentive was **subsidies or discounts on fuel**, chosen by one port authority and 25 fishers, who emphasised the high cost of fuel and lack of existing support as their reasons for this choice. **Subsidies based on the amount of litter delivered** were preferred by one manager of a fishing association and 10 fishers seeking a simple, convenient and motivating incentive. **Payment by waste companies** was favoured by two managers of fishing associations stating that this incentive would offer most flexibility for fishers in choosing how to spend it. The main reported **challenges** were:

- Lack of adequate port infrastructure (e.g., weighing system and designated disposal points).
- Risk of fraud / abuse of the scheme
- Lack of port infrastructure
- Need for strong monitoring and compliance systems: Closed-Circuit Television (CCTV) and verify waste authenticity
- Administrative and operational burden

3.1.4 Portugal

In Portugal, the most widely preferred incentive among fishers was **subsidies or discounts on fuel**, selected by 31 fishers, who emphasized fuel as the highest operational cost and highlighted its benefits for both vessel owners and crew. **Subsidies based on the amount of litter delivered** were chosen by 20 fishers, valued for creating a fairer and simpler system, while **discounts on fishing gear** attracted limited support (six fishers) mainly for their role in linking rewards to the quantity of waste collected. Three Port authorities favored **recognition and awareness campaigns**. One port authority and a fishery manager favored **reductions in port fees**, citing feasibility within existing frameworks and their motivational potential. **Reduction in fish auction costs or right to first sale** was chosen also by another port authority and a fishery manager. The two fisheries regulators preferred **payment by waste companies**, arguing that fishers should be compensated through the recycling value chain.

Across all incentives, shared challenges include organizational complexity, logistical constraints in waste collection and storage, and the need to ensure fairness and meaningful compensation, while incentive specific barriers range from tracking and verification difficulties (fuel subsidies), sorting and quantification issues (payments by waste companies), to limited external support for gear-based incentives.

3.1.5 Spain

Spanish stakeholders identified a mix of financial and non-financial incentives to encourage the delivery of marine litter and ALDFG. The most strongly supported measure was **subsidies based on the amount of litter delivered**, selected by nine fishers and two fishing association managers due to the clarity, immediacy, and direct link between effort and reward, although concerns were raised about long-term financial sustainability. **Reductions in port fees** was favored by one port authority 5 fishers and a policymaker as a stable and feasible port-managed incentive that compensates fishers for existing taxes and costs. **Fuel subsidies or discounts** was selected by one port authority and 5 fishers were considered highly motivating given rising operational costs but face fiscal and budgetary constraints. One port authority and 4 fishers preferred **reductions in fish auction costs or preferential access to first sale**, described as offering indirect economic benefits. Two port authorities selected **recognition and awareness campaigns** saying they could help avoiding the commercialization of litter collection, despite their lower immediacy for

rewarding fishers. Overall, stakeholders highlighted the need for combined incentive schemes to balance short-term motivation with long-term engagement.

Across all countries, a clear pattern emerges: fishers consistently prioritize direct economic incentives linked to operational costs, while institutional actors emphasize governance feasibility, monitoring, and long-term funding stability. This highlights a structural tension between economic motivation and policy implementation constraints.

Main challenges mentioned were **financial sustainability and economic burden, administrative complexity and limited port capacity** to manage additional systems and controls. Concerns were also raised about **fraud, monitoring and measurement of collected waste**, as well as **logistical constraints and insufficient infrastructure**, which could undermine long-term fisher participation and the overall effectiveness of reward program. Specific to payments by waste companies, it was mentioned that small waste contractors might have **limited capacity to absorb additional systems or waste volumes**, warning that a surge in passively collected marine litter could **trigger extra disposal costs**, as contractors may require additional payments beyond standard MARPOL waste services.

3.2 Recommendations for the implementation of a Fishers' Reward Program

3.2.1 Croatia

Stakeholder perspectives from Croatian fishers, port authorities, fishing association managers, regulators, and EU level policymakers provide valuable insights for designing an effective Fishers' Reward Program, including the need to balance economic incentives with environmental sustainability objectives. While there is clear alignment on preferred incentives, the depth of engagement and the concerns raised vary substantially across groups, shaping both opportunities and constraints for policy implementation.

Almost all Croatian fishers agreed on **fuel subsidies or fuel related discounts** as the preferred incentive. Only a handful identified challenges or proposed improvements. This might suggest limited familiarity with the program concept or low perceived relevance at this early stage. Despite this low engagement, the shared preference for fuel support reflects a strongly aligned economic priority among fishers but may also indicate a limited consideration of the broader environmental implications of such incentives.

Other stakeholders—including port authorities, association managers, regulators, and EU policy-makers—converge around the need for clear procedures, coordinated governance, and improved waste management infrastructure.

Port authorities emphasize awareness raising, clear disposal rules, and practical program design based on real port practices. In addition, they mentioned the possibility to obtain financial support from the Environmental Protection and Energy Efficiency Fund. They also recommend involving municipalities, waste-management companies, home-port fishers, and relevant national ministries (Agriculture, Environment, Economy).

Fishing association managers highlight financial constraints, risk of misuse, and insufficient infrastructure, proposing mitigation through CCTV, staff verification, smart containers, clearer roles, and upgraded waste management systems. They also support national level funding (especially via the Environmental Protection and Energy Efficiency Fund) and advocate for clear shared responsibilities across cooperatives, port authorities, and relevant ministries. Emphasize participation of fishing cooperatives (often concessionaires), resident and transit fishers, municipal waste companies, and a mix of local and national authorities.

Fisheries regulators point to major challenges in waste traceability, quantification, and legal alignment, stressing the need for interministerial coordination, clear responsibilities, and long-term funding mechanisms. In agreement with other stakeholders, they recommend financing via environmental funds and monitoring by specialized inspectorates. Highlight participation across three to four ministries, reflecting a complex governance environment (Sea/Transport, Environment, Fisheries), and requiring clearly defined roles and accountability mechanisms across institutions.

Overall, Croatian stakeholders show strong alignment on the need for improved procedural clarity and funding. The limited feedback from fishers might suggest the need for further engagement, while the detailed institutional insights from other actors provide a robust foundation for designing a transparent, coordinated, and operationally feasible rewards program.

3.2.2 Italy

Italian port authorities (IT01 and IT02) show strong support for **reductions in port fees** as the preferred incentive, viewing it as a practical and motivating measure for vessels delivering marine litter and ALDFGs. One port authority (IT02) highlights the need for a clear regulatory

framework and robust verification systems to prevent misuse (e.g. land-based waste being presented as marine litter). Suggested mitigation measures focus on increased vigilance and monitoring at ports. Port authorities stress the importance of involving fishing cooperatives, fishers' associations, skippers, and relevant private companies.

Fishers (IT03 and IT04) clearly prefer **subsidies or discounts on fuel**, reflecting fuel's central role in vessel operations. The main challenge identified is the variation in engine types and fuel consumption, which complicates fair measurement and allocation of rewards. In these cases, no specific mitigation strategies or governance roles were proposed by fishers.

On the other hand, a manager of a fishing association (IT05), who chose **reduction in fish auction costs or right to first sale**, mentioned key barriers such as the lack of ecological islands and containers in ports, and gaps in authorizations and concessions that prevent waste from being collected once landed. To mitigate these challenges, they recommend dedicated waste collection infrastructure, clear legal authorizations, and the involvement of municipalities, regional governments, waste management companies, cooperatives, and collection centers. They strongly advise that a reward program should not rely on short term projects: planning and financing must be agreed at national level, with implementation and monitoring at municipal level. Longterm funding, clear legislation, and secure waste collection logistics are identified as prerequisites for the success of any incentive-based scheme.

3.2.3 *Malta*

The implementation of a Fishers Reward Program in Malta requires careful consideration of the practical, administrative, and institutional realities faced by the sector. Insights from fishers, port authorities, fishing association managers, regulators, and EU level policymakers reveal shared priorities as well as distinct expectations, offering a comprehensive basis for developing an effective and credible rewards scheme, including the need to balance economic incentives with environmental sustainability objectives.

Fishers highlighted several operational challenges that could hinder the effectiveness of a rewards program. Respondents noted limited space on vessels to store collected waste, alongside rising operational costs, including bait, fuel, and general expenditures. Additionally, many pointed to bureaucracy and administrative burdens as potential obstacles to smooth implementation. To ensure success, the program should prioritise simple administration, flexible and meaningful incentives, and solutions that respond directly to the practical constraints fishers face at sea.

Other stakeholders in Malta — including port authorities, fishing association managers, fisheries regulators, and EU level policymakers —emphasize the need for strong monitoring, adequate infrastructure, fair incentives, and streamlined administrative procedures. Their recommendations reveal both areas of convergence and distinct institutional priorities.

Port authorities highlight administrative and legal barriers, including unclear responsibility for waste-facility financing and the need for on-site security and inspections. Improved Closed-Circuit Television (CCTV), dedicated personnel, simple procedures, and inter-agency agreements are recommended. They also emphasise the need to educate fishers on their responsibilities and financial challenges.

Fishing association managers consistently identify similar obstacles to the rewards program: risk of fraud, lack of disposal sites, insufficient monitoring, and inadequate infrastructure. They propose CCTV, staff verification, designated disposal spaces, jumbo bags, and logbooks, and advocate broad participation from cooperatives, councils, Environment and Resources Authority (ERA), government-owned company responsible for waste treatment and infrastructure (WasteServ Malta Ltd), and fishers not belonging to associations. Oversight preferences vary (Aquatic Resources Malta, fishing cooperatives, or government authorities), but all agree on the need for transparent, simple systems. EU funding is preferred, often supplemented by national support.

The regulator interviewed emphasized aligning the reward program with existing port procedures, improving waste infrastructure, and ensuring responsive collection services, especially during high activity seasons. They call for collaboration between cooperatives, ERA, Transport Malta, the Fisheries Department, and fish farms, alongside dedicated bins and a waste retrieval hotline.

3.2.4 Portugal

Port authorities identify several preferred incentives, including **reductions in fish auction costs** (PT01), **reductions in port fees** for vessels delivering marine litter (PT04), and **recognition and awareness campaigns** (PT02, PT03, PT05). Key challenges include lack of control and supervision in ports, risk of abuse (e.g. adding heavy objects to increase rewards), bureaucratic inertia, and coordination difficulties across institutions. Suggested mitigation strategies focus on consolidating waste management under a single entity such as Docapesca, increasing vigilance and inspections, implementing loyalty systems, and strengthening education and awareness among fishers. Port authorities emphasized the involvement of Docapesca, fishing associations,

producer organizations, local authorities, and media, with ports often leading implementation. Oversight and monitoring should rely on permanent personnel, inspections, and continuous information sharing, while design and funding decisions require institutional commitment and program continuity.

Fishers predominantly prefer **fuel subsidies or discounts** (PT06, PT08, PT11, PT12, PT13) and **subsidies based on the amount of litter delivered** (PT07, PT10, PT19). Fuel incentives are valued because they add value to waste and increase participation, while effort-based payments are seen as fairer. Challenges include weak organization and tracking of collected waste and concerns about fairness. Fishers point to fishing associations and port authorities/managers as appropriate actors to oversee design, implementation, and monitoring, indicating trust in representative bodies rather than individual administration.

Managers of fishing associations favor **reductions in port fees** (PT15) and **reductions in fish auction costs or first sale rights** (PT16). Their main concern is not fisher acceptance, but institutional and financial constraints, such as Docapesca's reluctance to reduce fees and lack of infrastructure. Mitigation strategies include dedicated containers close to landing areas and keeping the program simple and easy to use and communicate. They recommend funding through Docapesca, [MAR2030](#), or similar schemes, and argue that design, implementation, and monitoring should be led by Docapesca, possibly in coordination with producer organizations and project teams.

Fisheries Regulators (PT17, PT18) Regulators strongly support **payment by waste management companies**, arguing that fishers should be compensated through the recycling value chain rather than subsidies. Key challenges include sorting and quantifying waste, identifying responsible vessels, temporary storage, and low waste volumes in some ports, which reduce recycler interest. They recommend investment in dedicated storage facilities, additional labor capacity, and national level program design integrated across different port governance models. Funding should primarily come from waste management companies, with port authorities or municipalities overseeing implementation and monitoring. Regulators stress that long term viability depends on inclusive stakeholder involvement, economic attractiveness across the value chain, and avoiding isolated, short-term projects.

3.2.5 Spain

Spanish Port Authorities show diverse preferences, reflecting different institutional roles and constraints. Preferred incentives include **recognition and awareness campaigns** (ES01, ES03),

fuel subsidies or discounts (ES02), reductions in port fees (ES04), and reductions in fish auction costs or first sale rights (ES05). While explicit challenges were not detailed by this group, their preferences suggest concerns about budgetary feasibility, avoiding over-commercialization of litter collection, and the relative simplicity of implementation. Recognition-based incentives are seen as low-cost and reputational, while port-managed incentives rely on existing fee structures. Port Authorities are implicitly positioned as key actors in implementation and operational oversight, with potential roles in monitoring through port services. Their involvement in design and funding is implied where incentives fall under port competencies, typically in coordination with public administrations.

Fishers primarily favor direct economic incentives, notably **subsidies proportional to the amount of litter delivered (ES06, ES09), fuel subsidies or discounts (ES08), reductions in fish auction costs or first sale rights (ES07), and reductions in port fees (ES10).** These incentives are perceived as fair, tangible, and directly linked to effort or high operational costs. Although fishers did not explicitly articulate challenges or mitigation strategies, their preferences indicate sensitivity to fuel prices, taxes, and input/output margins. They implicitly expect simple, low-bureaucracy schemes, with trusted bodies such as port authorities and fishing associations playing roles in design, implementation, and monitoring. Fishers are the core participants in the reward scheme but not positioned as funders or sole overseers.

Managers strongly support **subsidies linked to the quantity of litter delivered**, with ES11 explicitly recommending a mixed model combining subsidies with payments by waste companies. This group provides the most detailed analysis of risks, identifying fraud, misuse of containers, declining participation over time, and logistical barriers such as inadequate infrastructure and access to disposal points. Mitigation strategies include secure and monitored infrastructure, exclusive-use containers, periodic controls, and making the system easy and convenient to maintain long-term engagement. They advocate broad participation by fishing associations, port authorities, public administrations, NGOs, and private companies, with supervision ultimately resting with the competent public administration (e.g. the regional authority). Funding should primarily come from public sources, especially European and national funds such as FEMPA, complemented by CSR-motivated private companies. Design, implementation, and monitoring are all assigned mainly to public administrations, with coordination across sectors. Additional recommendations stress adapting the program to different fishing subsectors, focusing on high-litter areas, and upgrading port infrastructure before launching.

The national policymaker favors **reductions in port fees** as a stable and institutionally feasible incentive. Key challenges include calibrating payments, administrative complexity, variability linked to private waste companies, insufficient port facilities, and the risk of discouraging participation through excessive bureaucracy. Mitigation strategies focus on small-scale pilot projects, adaptive management, strong statistical and scientific support for calibration, and maximum logistical facilitation at port level, including onboard containers and port-side handling. The policymaker calls for broad stakeholder participation, including port authorities, public administrations, municipalities, NGOs, fishing and shipowners' associations, and scientific institutes. Funding could come from ports, municipalities, or shipowners' associations, particularly for pilots. Design and implementation should be led by port authorities and public administrations, while monitoring should involve NGOs, regional and national authorities, and specialized foundations. The overarching recommendation is to avoid isolated, short-term schemes in favor of scalable, well-coordinated programs.

3.2.6 EU policymakers

EU level policymakers (EU01, EU02) highlight several key challenges associated with implementing a Fishers' Reward Program. A central concern is the need to clearly distinguish passively collected marine litter from fisher generated waste, ensuring that incentives apply exclusively to the former (EU01). Both policymakers underline risks related to bureaucratic complexity, lengthy legal processes, and slow or rigid payment systems, which could discourage participation if fishers are required to bear administrative burdens or delays (EU02). Additional challenges include verifying litter origin, determining fair compensation when fishers are not actively fishing, and aligning incentives with existing regulatory frameworks.

To mitigate these challenges, EU01 and EU02 recommend robust verification mechanisms and the use of existing EU policy frameworks, such as the Port Reception Facilities Directive and the Single Use Plastics Directive, to reduce regulatory fragmentation (EU01). EU02 emphasizes the importance of agile, fast, and low burden administrative processes, suggesting that payment systems must be simple and timely to remain credible incentives. Pilot testing, including business model experimentation, is strongly encouraged to assess feasibility before scaling up (EU02).

Both policymakers stress that relevant stakeholders should include environmental agencies at Member State level, fisheries ministries, and organizations representing small scale fisheries

(EU01, EU02). The second EU policymaker (EU02) additionally highlights a role for private entities in early stages.

Regarding funding, EU02 advises starting with private funding mechanisms to avoid initial bureaucratic constraints, with gradual integration of public funding once schemes are proven. EU01 implicitly supports public involvement through established EU and national frameworks.

In terms of governance, EU policymakers should retain oversight of design and strategic alignment, while implementation and monitoring should ensure transparency, proper verification, and demonstrable environmental impact. EU02 further recommends linking reward schemes to complementary initiatives (e.g. Blue Carbon credits) and scaling up only those schemes that demonstrate effectiveness in practice.

Overall, both EU01 and EU02 advocate for a phased, pragmatic, and evidence-based approach, prioritizing simplicity, fairness, and policy coherence over rapid but rigid regulatory deployment.

3.3 Receptiveness of fisheries regulators and EU policymakers

Stakeholders across EU policy institutions and fisheries authorities display an overall positive but conditional receptiveness toward reward-based programs aimed at incentivizing the collection of marine litter. Interviews reveal shared recognition that **marine litter—particularly when passively collected—is an external burden on fishers**, and that compensation or supportive mechanisms are justified to maintain fairness and operational viability.

3.3.1 Fisheries Regulator from Croatia

The interviewed fisheries regulator demonstrates strong operational receptiveness grounded in their direct engagement with ports and fishers. This fisheries regulator (HR13) identifies reductions in port fees as the most meaningful incentive, noting that such measures align with existing Croatian legislation and directly reduce high operational costs. However, they underline that feasibility requires legal amendments, stronger coordination among port authorities and concessionaires, and enhanced capacity for waste handling. HR13 also highlights multiple trade-offs, including unclear responsibilities, insufficient staff and infrastructure, gaps in legislation governing waste collected outside port areas, and variability in waste volumes that challenge economic viability. Longterm implementation, they argue, depends on stable national level financing, ideally through Croatia's Environmental Protection and Energy Efficiency Fund, and on embedding the program within permanent regulatory structures.

3.3.2 Fisheries Regulator from Malta

The Maltese fisheries regulator (MT13) demonstrates a high level of operational receptiveness, emphasizing that a pilot scheme is feasible if underpinned by government support and adequate portside capacity. MT13 notes that Maltese fishers already retrieve large quantities of litter passively and that structured incentives, including for sustainable gear, could encourage proper disposal and reduction of ghost nets. However, feasibility depends on clarifying responsibility for waste handling, strengthening port infrastructure, and ensuring coordination across cooperatives, agencies, and fish farms. Although MT13 would give priority to incentives that encourage sustainable, biodegradable gear and reduced pollution such as discounts on more sustainable and biodegradable gear, as fishers cannot afford biodegradable gear without support (Table 3). This also would then align with broader sustainability goals and reward schemes could be a part of a wider transition towards cleaner engines, alternative fuels, biodegradable nets—all linked to reduced pollution.

The fisheries regulator (MT13) also recognizes that similar past experiences with reward schemes yielded positive results in Malta. In this case, the government compensated fishers for collected waste, reinforcing fishers' openness. All in all, the fisheries regulator (MT13) believes the program is possible and potentially effective, but only if backed by adequate government incentives, aligned with fishers' operational realities, and supported by the existing port infrastructure (stressing the especially the central role of Marsaxlokk port).

Table 3. Examples of receptiveness Evidence from the Maltese Fisheries Regulator.

Receptiveness	Evidence (quotes or paraphrased statements)
Incentives can meaningfully improve environmental outcomes	"If we want fishing to be more sustainable... discounts on fishing gear will encourage fishers to purchase biodegradable gear." "Affordability is key—if the (biodegradable) gear is cheaper, they can go for it."
Incentives drive participation and behaviour change	"If there are more incentives then fishers will be encouraged to collect more waste from the sea." "Fishers would benefit, and in turn, they would be more willing to cooperate, collect more waste, and follow the procedures."
Belief that the program is feasible if adequately supported	"if there is support from the government, then these things can become possible."

3.3.3 Fisheries Regulator from Portugal

Interviews with fisheries regulators (PT17, PT18) indicate a generally high level of receptiveness towards the development of a pilot rewards program aimed at incentivizing fishers to collect marine litter. Both regulators recognize the relevance of incentive-based approaches as a complementary tool to existing marine litter management policies, particularly when designed to align with established waste and recycling systems.

Regulators expressed a clear preference for market-based reward mechanisms over direct public subsidies. According to one regulator (PT17), payments linked to waste management or recycling companies are perceived as the “most viable and fair option,” as they are economically grounded and consistent with how waste recovery value chains already operate. The other regulator (PT18) similarly highlighted that compensation schemes funded by waste management companies are both feasible and equitable, especially in ports where recycling activities are already established.

Despite this positive outlook, both interviewees stressed that operational feasibility is highly context dependent. Key constraints identified include logistics related to the reception, quantification, temporary storage, and transport of collected marine litter. The second regulator (PT18) emphasized that these logistical challenges generate additional costs and can discourage participation if not adequately addressed. Infrastructural limitations—such as insufficient storage facilities or unsuitable conditions for storing wet or odorous materials—were also identified as critical barriers. Moreover, both regulators noted that recyclers often require predictable and sufficient waste volumes, which smaller ports may struggle to provide, potentially limiting the economic viability of market-based arrangements in certain locations.

Regarding unintended effects, regulators cautioned that reward programs must remain worthwhile for fishers; otherwise, participation rates are likely to remain low (PT18). The first regulator (PT17) additionally warned that ports generating small quantities of waste may be overlooked by waste management companies, leading to territorial imbalances in program implementation.

Importantly, both regulators (PT17, PT18) converged on the view that reward programs can contribute to long term solutions only if embedded within a broader, well-structured policy framework. Incentive schemes are seen as effective for awareness raising and behavior change, but they require continuous follow-up, institutional support, and sustained engagement with fishers to deliver durable outcomes and avoid becoming isolated or short-lived interventions.

3.3.4 Policymaker from Spain

While fisheries regulators were interviewed in the other case-study countries, an equivalent interview could not be conducted in Spain due to access constraints. As an alternative, the study includes the perspective of a national policymaker involved in fisheries and marine environmental policy, providing insight into the regulatory and institutional context relevant to reward-based pilot schemes.

The interview with the Spanish policymaker (ES13) reveals a highly positive receptiveness toward the development of a pilot rewards program. The policymaker (ES13) recognizes the potential value of incentive-based approaches, particularly when they are designed to operate through ports as central implementing actors.

From an institutional perspective, the policymaker (ES13) considers reward programs viable when managed via port authorities, notably through public contracts and existing port-based mechanisms. Port-managed incentives—such as reductions in port fees for vessels delivering marine litter—are viewed as more robust and reliable than schemes relying on private waste-management companies (which can be very heterogeneous) or subsidies (which are not stable in the long-term). According to the policymaker (ES13), ports benefit from financial autonomy, stable income streams, and established administrative structures, which make them better positioned to manage incentive schemes in a transparent and predictable manner.

Despite this general openness, the policymaker (ES13) stresses that design and implementation risks are substantial. A central concern is the possibility that fishers could bear a disproportionate burden if reception facilities, logistics, or support services are inadequate. Poorly calibrated incentives may lead to inefficiencies or inequities, particularly if payment levels are not regularly adjusted or if differences across ports and fleets are not taken into account. The policymaker (ES13) also highlights the difficulty of setting appropriate payment levels, both initially and over time, given the heterogeneity of fishing operations and the variable nature of marine litter volumes.

Linking rewards to private waste-management companies is seen as problematic, as the policymaker (ES13) anticipates high variability in payments, limited capacity to handle large volumes or heavy waste, and increased administrative complexity. Multiplying contracts and procedures could generate excessive bureaucratic burdens, potentially discouraging fisher participation rather than encouraging it.

Regarding funding, the policymaker (ES13) identifies ports, municipalities as the main potential contributors. Followed by shipowners' (*armadores*) associations, particularly in pilot phase. Importantly, ES13 does not view reward schemes as a standalone or permanent solution. Instead, they are framed as one component of an adaptive and evolving policy mix, capable of delivering positive contributions when embedded within broader marine litter.

3.3.5 EU Policymakers

Among EU policymakers, receptiveness is shaped by the need for legal clarity, administrative feasibility, and alignment with existing regulatory frameworks. One EU policymaker (EU01) expresses openness to integrating incentives into current structures—such as EMFAF, EPR systems, port reception rules, and recognition-based program—while emphasizing that any financial incentive should only apply to passive, non-fisher generated litter, and must not create unintended effects or distort fishing effort. The other EU policymaker (EU02) demonstrates a more pragmatic receptiveness, showing support for fuel subsidies or discounts as long as administrative processes remain simple, rapid, and nonburdensome, and provided that incentives genuinely compensate for costs. Both highlight that bureaucracy and regulatory ambiguity could undermine program uptake.

One EU policymaker (EU01) states that financial incentives are valid and justified when fishers collect marine litter that is not generated by themselves. This interviewee repeatedly affirms the principle that costs imposed on fishers by external marine litter should be compensated: “If the marine litter source is from outside the fishing activity... then some sort of incentive should apply.”. This EU policymaker (EU01) mentions multiple EU funding sources and notes these could be used for marine-litter reward schemes. This indicates openness to studying and designing the most appropriate incentive (Table 4). On the other hand, the other EU policymaker (EU02) understands fishers can benefit from these incentives, especially that small-scale fisher (rewards could be “an effective long-term solution... especially for the small ones.”). Additionally, this EU policymaker EU02 showed a strong belief that fishers need monetary rewards, which would help maintain small-scale fisheries which are already at risk (Table 4).

Table 4. Examples of receptiveness evidence from EU policymakers.

Receptiveness	Evidence (quotes or paraphrased statements)
Belief that passive marine litter collection deserves compensation (EU01)	"If it is passive fishing of marine litter... then some sort of financial incentive should apply"
Fairness principle: fishers should be compensated for costs caused by external litter (EU01)	"If the marine litter source is from outside the fishing activity... then some sort of incentive should apply"
Preference for fuel subsidies or discounts as effective incentives (EU02)	"Subsidies or discounts on fuel... could work, but it has to come quite fast"
Strong support for monetary rewards (EU02)	"If you go with peanuts, they (fishers) will think their effort is not worth it"

Overall, regulators and policymakers show **aligned motivation but differing priorities**: EU actors are primarily concerned with **policy coherence, legal boundaries, and administrative efficiency**, while port authorities focus on **practical implementation needs and stakeholder coordination**. This creates a favorable environment for a pilot program, provided that it integrates **clear eligibility rules, streamlined processes, and adequate support mechanisms**.

Overall, receptiveness can be characterised as 'conditionally positive', with strong conceptual support for reward-based schemes but clear concerns regarding feasibility, administrative burden, and long-term sustainability.

3.4 Virtual Reality Experience

This section presents the results obtained from the pre- and post-exposure empathy questionnaires administered alongside the VR experience during specific events, including [Ecomondo Italy](#) - an international marine science event in Rimini (November 2025), fishers' associations in Croatia (October 2025), Malta (February 2026) and Spain (March 2026) and the [EU Mission Ocean & Waters Forum in Brussels](#) (Belgium, March 2026).

The analysis aims to evaluate the extent to which the immersive scenarios influenced participants' emotional responses, cognitive understanding, and attitudes towards marine litter and related mitigation strategies.

To capture a comprehensive perspective across the value chain, respondents were grouped into four key stakeholder categories: (1) fishers and managers of fishing associations; (2) policymakers; (3) other actors within the fishing sector; and (4) the general public. This

segmentation allows for a comparative assessment of how different stakeholder groups perceive marine litter challenges, respond to immersive storytelling, and express willingness to engage in corrective actions or support policy measures.

The results presented below highlight both common trends and group-specific differences, providing insights into the effectiveness of the VR experience as a tool for fostering empathy, enhancing awareness, and supporting stakeholder engagement within the context of marine litter management.

3.4.1 *Fishers and managers of fishing associations*

A total of 17 stakeholders from this group participated in the VR-based empathy assessment (Figure 2). Overall, their responses indicate that the immersive experience was positively received and contributed meaningfully to shaping attitudes and motivations related to marine litter. Given their direct and daily interaction with the marine environment, this cohort provides particularly valuable insights into how immersive technologies may support behavioural change and communication strategies within the fishing sector.



Figure 2. VR launch events with fishers in Croatia and Malta.

Awareness and knowledge of ML

Prior to the VR experience, participants stated a high baseline awareness of marine litter, with 88% reporting that they already knew “quite a lot” about the issue (Figure 3). Despite this relatively strong starting point, the VR scenarios were still able to provide added value: 41% indicated that the experience delivered substantial new information, while an additional 24% gained “a little” new understanding (Figure 3).

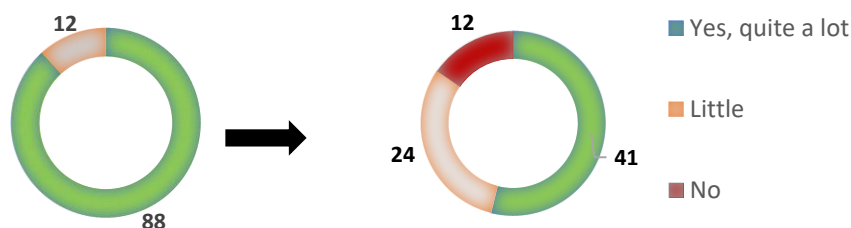


Figure 3. Fishers (in percentages) reporting their awareness and knowledge level regarding marine litter after the VR experience.

Perceived public perception of fishers

Participants were also asked whether they believed the VR experience could influence public opinion of fishers in their country. A strong majority (82%) felt that the VR could improve public perceptions (Figure 4). A small proportion (12%) expected no change, while 6% anticipated a possible negative shift, underscoring that communication strategies must remain sensitive to the diversity of narratives surrounding fisheries.

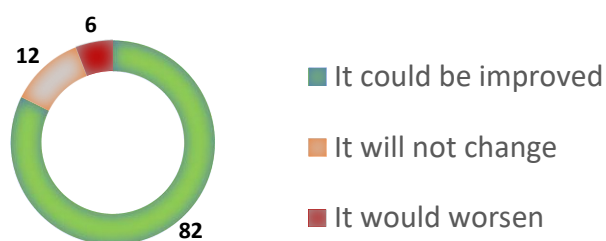


Figure 4. Fishers (in percentages) reporting their opinion on the public perception of fishers after the VR experience.

Shift in attitudes towards the future of marine debris

One of the clearest effects of the VR experience was the change in participants' outlook on the future of marine debris. Before the VR exposure, 59% described themselves as optimistic, 24% as neutral, and 18% as pessimistic. Following the experience, optimism increased markedly to 76%, while neutrality decreased to 12% (Figure 5). The proportion of pessimistic participants remained stable at 12%, indicating that while the VR scenarios generally fostered constructive attitudes, some concerns persist.

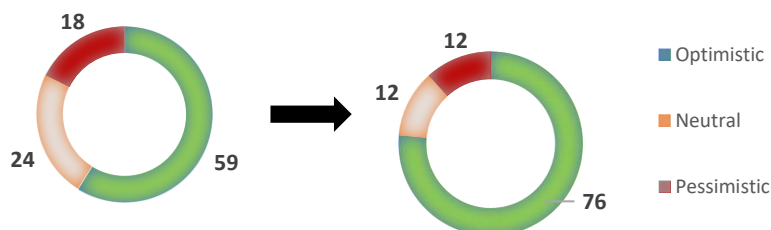


Figure 5. Fishers (in percentages) reporting their attitudes towards the future of marine debris.

Motivation to take action against marine litter

Before the VR experience, responses were broadly positive, with ratings clustered between 7 and 10 (Figure 6). Six in ten (59%) respondents selected the maximum motivation score (10) even before exposure, suggesting a strong pre-existing commitment within this stakeholder group. After the VR experience, motivation increased further up to a 76%, while small proportions selected lower values (5 and 7). These results indicate that the VR experience strengthened the resolve of participants who were already environmentally engaged and may serve as an activation tool for further collective action within fishing communities.

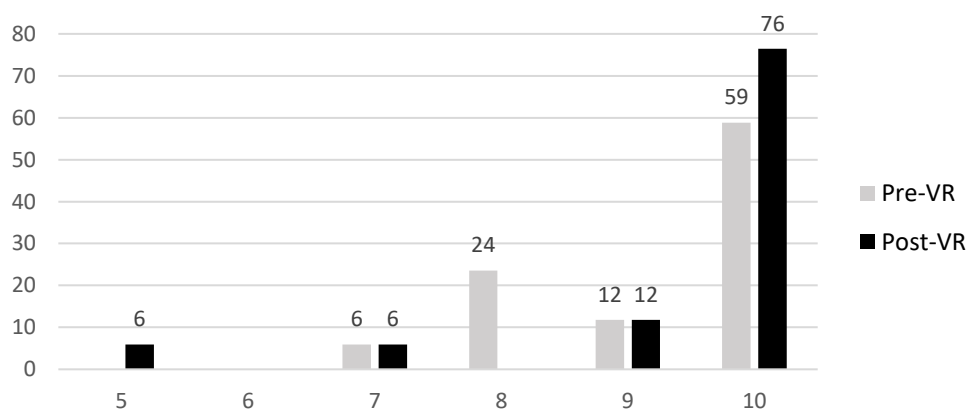


Figure 6. Fishers (in percentages) reporting their motivation to take action against marine litter before and after the VR.

3.4.2 Policymakers

A total of five policymakers participated in the VR-based empathy assessment (Figure 7). Although the sample size is smaller than in other stakeholder groups, the insights provide a meaningful indication of how institutional actors—who often design or influence marine governance frameworks—perceive the added value of immersive technologies for awareness-raising and behavioural change.



Figure 7. VR launch event in Malta with a policymaker.

Awareness and knowledge of ML

Policymakers demonstrated the highest possible level of prior knowledge regarding marine litter: all five policymakers reported that they already knew “quite a lot” about the issue. This is expected given their professional roles and exposure to regulatory, environmental, and sustainability agendas. Even so, the VR experience contributed additional information to some extent. While only one stated that the VR provided “quite a lot” of new information, three reported learning “a little,” and one said it offered no new insights. This suggests that immersive media can still complement existing policy knowledge, primarily by contextualising environmental impacts and providing first-person perspectives that traditional reports or briefings cannot fully deliver.

Perceived public perception of fishers

Policymakers were also asked whether the VR experience influenced their opinion of fishers. Three indicated that their opinion had improved, while two reported no change (Figure 8). Importantly, no respondents perceived a worsening of their opinion. This outcome implies that the VR narratives may help policymakers better appreciate the role, challenges, and environmental contributions of fishers, although many already held a stable or favourable view. It also shows that immersive storytelling can serve as a bridge between policy professionals and practitioners at sea, especially in areas where public narratives around fisheries are shaped by limited visibility of daily practices.

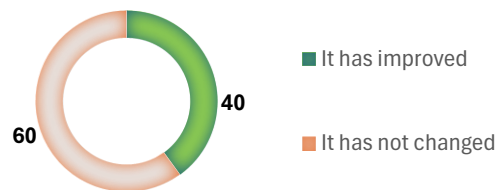


Figure 8. Policymakers (in percentages) reporting their opinion on the public perception of fishers after the VR experience.

Shift in attitudes towards the future of marine debris

Before exposure to the VR scenarios, policymakers exhibited a predominantly pessimistic outlook towards the future of marine debris: four identified themselves as pessimistic, one as optimistic, and none were neutral. This pessimism likely reflects institutional awareness of the scale, complexity, and persistence of the marine litter problem (Figure 9). After the VR experience, optimism doubled from one to two policymakers, while pessimism decreased to three (Figure 9). Although pessimistic views remained dominant, the shift indicates that the immersive experience helped one participant envision a more hopeful or actionable pathway forward. Given the role policymakers play in shaping marine strategies, even modest shifts in optimism may support greater openness toward innovative mitigation measures or cross-sector collaborations.

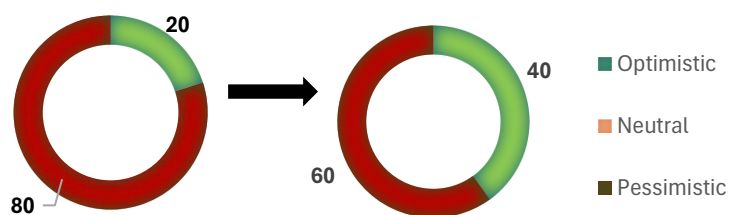


Figure 9. Policymakers (in percentages) reporting their attitudes towards the future of marine debris before and after the VR experience.

Motivation to take action against marine litter

Motivation levels among policymakers were already exceptionally high before the VR experience (Figure 10). After exposure to the VR, the distribution remained unchanged, indicating that the experience reinforced existing motivation but did not significantly elevate it further—likely because policymakers were already operating at maximum or near-maximum motivation levels.

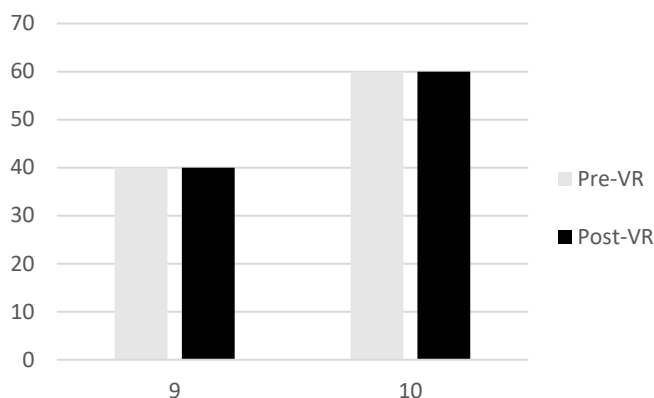


Figure 10. Policymakers (in percentages) reporting their motivation to take action against marine litter before and after the VR.

3.4.3 Other actors within the fishing sector

Seven stakeholders representing other professions within the fishing sector took part in the VR experience (Figure 11).



Figure 11. VR experience in Italy with “Other actors within the fishing sector”.

Awareness and knowledge of ML

Similar to policymakers, all of the participants in this group reported that they were already well informed about the problem of marine litter. This indicates a high baseline awareness across the sector, likely due to frequent exposure to environmental discussions, operational impacts, and regulatory requirements. Despite this, the VR experience delivered substantial new knowledge: 71% stated that it provided “quite a lot” of new information, while 14% learned “a little” (Figure 12). Only 14% reported that they learned nothing new. This suggests that VR is particularly effective for this stakeholder group in deepening contextual understanding—even when

foundational knowledge is already strong—by allowing them to visualise the broader ecological and occupational consequences of marine litter.

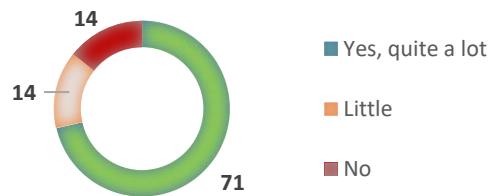


Figure 12. “Other actors within the fishing sector” (in percentages) reporting their awareness and knowledge level regarding marine litter after the VR experience.

Perceived public perception of fishers

When asked whether the VR experience changed their opinion of fishers, responses were mixed. Four in ten (43%) stated that their opinion had improved, while another 43% reported no change. Notably, 14% indicated that their opinion had worsened—the only stakeholder group where a negative shift was recorded (Figure 13). This finding may reflect the internal dynamics and diverse perspectives within the fishing sector. However, the fact that nearly half viewed fishers more positively suggests that immersive narratives can still act as a bridge, reinforcing shared environmental commitments and highlighting the operational difficulties fishers face in addressing marine litter.

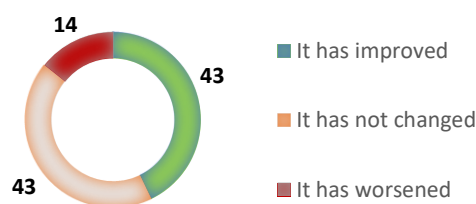


Figure 13. “Other actors within the fishing sector” (in percentages) reporting their opinion on the public perception of fishers after the VR experience.

Shift in attitudes towards the future of marine debris

Participants’ outlook on the future of marine debris shifted positively after the VR experience (Figure 14). This shift indicates that the VR experience helped many respondents feel more hopeful about the potential for mitigation and improvements in marine litter management. The emergence of a neutral group also suggests that some participants re-evaluated their positions, possibly adopting a more nuanced or cautious perspective.

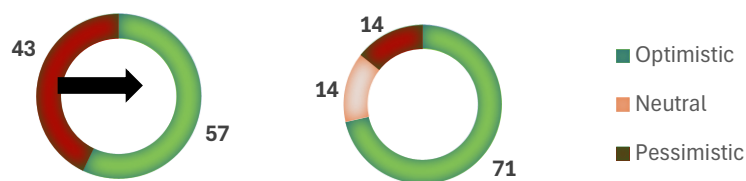


Figure 14. “Other actors within the fishing sector” reporting their attitudes towards the future of marine debris before and after the VR experience.

Motivation to take action against marine litter

Before the VR experience, responses (in percentage) were varied but leaned strongly toward high motivation. After the VR experience, the distribution shifted upward (Figure 15). These results show that the VR scenarios effectively increased motivation within this group, raising mid-range scores and consolidating high motivation levels.

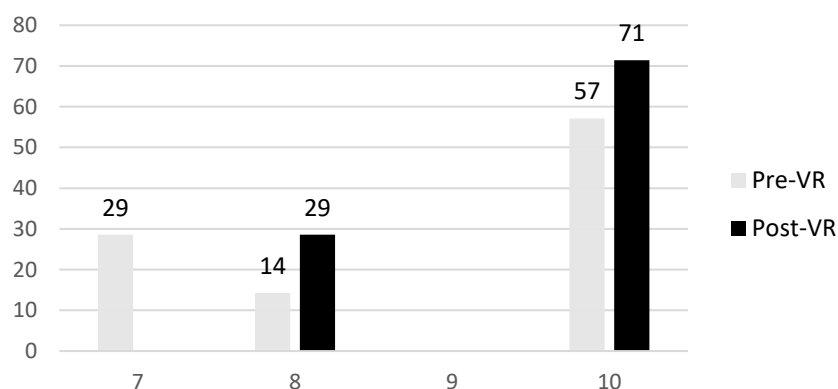


Figure 15. “Other actors within the fishing sector” (in percentages) reporting their motivation to take action against marine litter before and after the VR.

3.4.4 General public

A total of 18 respondents from the general public participated in the VR-based empathy questionnaires (Figure 16). As non-specialists and non-professionals within the fisheries domain, their responses are particularly valuable for understanding how immersive communication can shape public perceptions, environmental awareness, and motivation to engage in positive behavioural change.



Figure 16. VR experience in Italy with “Other actors within the fishing sector”.

Awareness and knowledge of ML

The majority of participants demonstrated a relatively high level of initial awareness: 72% reported knowing “quite a lot” about marine litter, while 28% indicated they knew “a little.” No respondents selected “no knowledge,” confirming that marine litter is widely recognised as a pressing environmental issue among the general public (Figure 17).

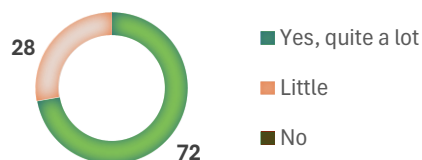


Figure 17. General public (in percentages) reporting their awareness and knowledge level regarding marine litter before the VR experience.

The VR experience clearly contributed to expanding this understanding, as 56% stated that they learned “quite a lot” of new information, 28% reported learning “a little,” and 17% indicated that the experience provided no new knowledge (Figure 18).

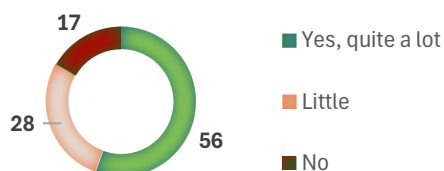


Figure 18. General public (in percentages) reporting their awareness and knowledge level regarding marine litter after the VR experience.

Perceived public perception of fishers

Exposure to the VR content had a generally positive influence on how respondents perceived fishers. 56% reported that their opinion had improved, while 44% stated that it remained unchanged. No participants indicated a worsened perception (Figure 19). For the general public—who often have limited direct interaction with the fishing sector—the VR experience appears to support a more empathetic and informed understanding of fishers’ roles.

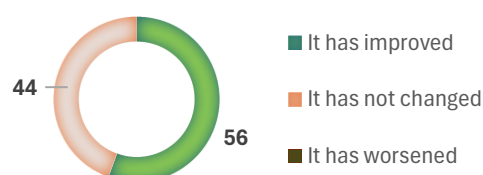


Figure 19. General public (in percentages) reporting their opinion on the public perception of fishers after the VR experience.

Shift in attitudes towards the future of marine debris

Before the VR experience, participants held predominantly pessimistic views regarding the future of marine debris. Nonetheless, after the VR exposure, attitudes shifted toward a more balanced and hopeful outlook (Figure 20). This represents a significant reduction in pessimism, dropping from 67% to 28%. The increase in neutrality (from 6% to 33%) suggests that several participants adopted a more measured or thoughtful stance after gaining a deeper understanding of the complexities and potential solutions presented in the VR scenarios.

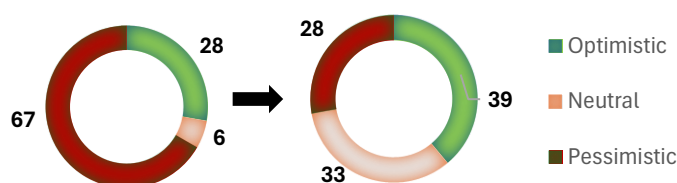


Figure 20. General public (in percentages) reporting their attitudes towards the future of marine debris before and after the VR experience.

Motivation to take action against marine litter

While the distribution became slightly more varied at the lower end (with 6% shifting from 5 to 6), the most notable changes occurred at the top of the scale. The proportion choosing 10 out of 10 increased from 44% to 56%, and a sizable 28% selected 9, showing a clear upward shift in

motivation (Figure 21). This demonstrates that the VR experience effectively strengthened participants' willingness to engage in environmental action.

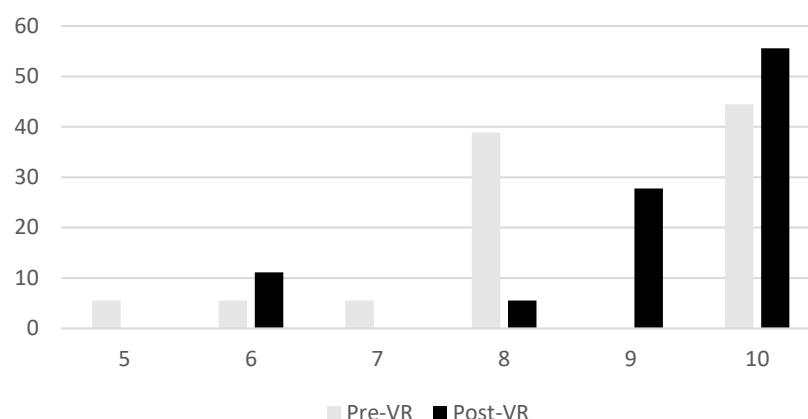


Figure 21. General public (in percentages) reporting their motivation to take action against marine litter before and after the VR.

3.4.5 General user experience and satisfaction

General user experience and satisfaction

Overall satisfaction with the VR tool was very high (Table 5). This level of approval highlights both the usability and narrative engagement of the VR system, reinforcing its suitability for continued deployment in the fishing sector—both for awareness-raising and for strengthening sector identity as a key factor in combating ML.

These results demonstrate that immersive technologies such as VR can act as effective boundary tools, bridging knowledge gaps between stakeholders and enhancing both cognitive understanding and emotional engagement in marine litter challenges.

Table 5. Reported user satisfaction with the VR experience.

Stakeholder Categories (n)	User experience and satisfaction
Fishers and managers of fishing associations (n = 17)	★★★★□ (4.76)
Policymakers (n = 5)	★★★★★ (5.00)
Other actors within the fishing sector (n = 7)	★★★★□ (4.86)
General public (n = 18)	★★★★□ (4.78)

4 Discussion

Differences among countries were identified regarding the most appropriate practices or incentives for a potential Fishers Reward Program, reflecting the perspectives of the various stakeholders interviewed. Despite these differences, subsidies or fuel discounts for participating vessels emerged as the most widely supported incentive, primarily due to fishers' interest in reducing one of the major operational costs of fishing activities.

However, this preference raises important policy considerations. While fuel-related incentives may increase participation, they must be carefully designed to avoid becoming unintended subsidies. Scientific evidence has shown that certain forms of subsidies can contribute to fishing overcapacity and, ultimately, to the overexploitation of fish stocks. Consequently, any incentive mechanism should be aligned with sustainability objectives and based on robust environmental and fisheries science.

It is therefore essential to consider not only the perspectives of the fishing sector but also the environmental implications of the proposed incentives. Reward programs should be tailored to specific fisheries, taking into account differences between small-scale and large-scale operations, as well as the cultural and socio-economic contexts of each country or region. Such contextualized approaches can improve the environmental suitability and effectiveness of the incentives.

Although substantial differences among countries were observed, several converging views also emerged among stakeholders, suggesting common ground for the design of reward-based management approaches.

4.1 Reward Program - Converging Views

4.1.1 *Port authorities*

Interviews with port authorities across Croatia, Italy, Malta, Portugal, and Spain reveal a high degree of convergence regarding reward programs.

Overall, most ports do not currently operate formal reward programs. Existing initiatives are generally limited to pilot projects, symbolic recognition, or awareness raising measures rather than structured financial incentives. Nonetheless, port authorities broadly recognize the potential value of reward programs and express openness to their implementation, provided that key structural conditions are met.



Across countries, there is strong agreement that any reward program must rest on stable and long-term financing, clear regulatory and institutional frameworks, and adequate waste management infrastructure. Ports emphasize the need for defined responsibilities among stakeholders, sufficient human and administrative capacity, and monitoring and control mechanisms to ensure transparency and prevent misuse of incentives. Isolated or short-term initiatives are widely viewed as ineffective.

With respect to incentives, port authorities consistently identify cost reducing measures as the most effective and acceptable options. Fuel subsidies or discounts, reductions in port or auction fees, and fee exemptions linked to waste delivery are seen as the most meaningful incentives for fishers, given their direct impact on operating costs. Recognition and awareness campaigns are broadly supported, but mainly as complementary tools rather than stand-alone incentives.

The feasibility is often questioned due to legal constraints, limited port autonomy over fees and taxes, and the risk of financial unsustainability. As a result, ports underline the need for national level support and alignment with existing regulations.

There is broad consensus that reward programs must involve multiple stakeholders, including port authorities, fishers and their organizations, waste management companies, fish markets, and relevant public authorities at local and national level. No port authority considers a reward program viable if managed by a single actor.

Commonly identified risks include insufficient or unstable funding, administrative complexity, fraud or abuse (such as false waste reporting), and the additional workload associated with measuring, recording, and verifying waste deliveries. To mitigate these risks, ports stress the importance of simple procedures, effective control systems, dedicated management resources, and clear communication with fishers.

Finally, port authorities agree that sustained fisher participation depends less on the size of rewards and more on ease of participation, continuity over time, and trust. Waste delivery must be quick and convenient, incentives must be predictable, and ongoing education, feedback, and recognition are necessary to foster long term behavioural change and embed marine litter recovery as a routine practice.

4.1.2 *Fishers*

Across all countries, fishers consistently identify financial incentives as the primary driver for participation. In particular, fuel subsidies or discounts are overwhelmingly preferred, as fuel



represents the single largest and most volatile operating cost in fishing activities. Other incentives, such as payments based on the amount of litter delivered, reductions in port or auction fees, or discounts on fishing gear, are also viewed positively, especially where they are perceived as fair, transparent, and directly linked to individual effort.

Fishers broadly agree that reward programs are attractive in principle but express concerns about their practical implementation. Commonly reported challenges include bureaucratic complexity, difficulties in measuring and verifying waste quantities, risks of fraud or unfair distribution, and uncertainty regarding the long-term sustainability of funding. Small vessel size and limited storage capacity are highlighted as practical constraints, particularly in artisanal fleets.

There is also shared concern about insufficient coordination and communication with responsible institutions. Fishers emphasise that overly complex procedures or delayed payments risk discouraging participation. Simplicity, clarity, and reliability are therefore seen as essential design features of any reward scheme.

Overall, fishers indicate that sustained participation depends on the economic relevance of the incentive, low administrative burden, and perceived fairness of the system. Incentives that reduce core operating costs, are easy to access, and are applied consistently over time are considered most likely to achieve lasting engagement in marine litter recovery activities.

4.1.3 Managers and fishing associations

Managers broadly support the introduction of reward programs and generally view them as feasible, provided that adequate infrastructure, funding, and governance arrangements are in place. Most consider that reward programs can play a meaningful role in supporting marine litter recovery, particularly when they acknowledge fishers' effort and costs, though several stress that incentives should complement—not replace—preventive and land-based waste management measures.

With respect to incentives, there is strong agreement that financial compensation linked to effort is the most effective approach. Frequently preferred options include fuel subsidies or discounts, payments based on the amount of litter delivered, and reductions in port or auction fees. These incentives are valued because they directly address operational costs or provide tangible recognition for time, fuel, and labour invested by fishers. Flexibility and perceived fairness in how rewards are calculated are repeatedly highlighted as critical factors.

Managers consistently identify infrastructure gaps as a major constraint. Common challenges include the lack of designated disposal areas, insufficient containers, absence of weighing or tracking systems, and unclear waste-collection logistics once litter is landed. Risks such as fraud, misuse of containers, and disputes over waste origin or measurement are also widely acknowledged. To mitigate these risks, respondents emphasise the importance of simple procedures, monitoring and verification systems, clear definitions of roles and responsibilities, and adequate staffing or technological support.

There is broad consensus that reward programs should be publicly funded, primarily through European and national funds, with implementation and oversight led by public administrations and port authorities in cooperation with fishing associations. Managers generally consider incentive schemes capable of supporting long-term engagement as long as funding, infrastructure, and rules remain stable, while stressing that wider policy measures focused on prevention, education, and land-based waste management remain essential to address marine litter at its source.

4.1.4 *Fisheries Regulators*

Regulators recognise incentive programs as a useful and potentially long-term component of marine litter management, provided they are embedded within stable legal frameworks and national-level systems. There is broad agreement that isolated, project-based or port-level initiatives are insufficient, and that incentive schemes should be aligned with existing waste-management legislation, fisheries regulation, and extended producer responsibility approaches.

With respect to incentives, regulators favour mechanisms that are structurally compatible with existing regulations and markets. Commonly supported options include reductions in port-related costs where legally possible, incentives linked to sustainable or biodegradable fishing gear, and payments derived from the valorisation and recycling of recovered materials. Fuel- or fee-based incentives are often seen as attractive in principle but constrained by national rules, existing subsidies, or regulated fee structures, reinforcing the need for alternative compensation mechanisms.

Across countries, regulators consistently identify logistical, legal, and institutional challenges as key barriers to implementation. These include unclear allocation of responsibilities for waste management in ports, insufficient infrastructure for sorting, storage, and reception of waste, difficulties in identifying waste origin and vessel contributions, and high operational costs. Risks

related to fraud, unfair compensation, and lack of economic viability—particularly in small ports with limited waste volumes—are also highlighted.

To mitigate these risks, regulators stress the importance of clear legal definitions, adequate waste-management infrastructure, trained personnel, and transparent monitoring and verification systems. Strong horizontal coordination between fisheries authorities, environmental agencies, port administrations, and waste-management actors is widely seen as essential. Regulators agree that funding should primarily come from European and national public sources, potentially complemented by revenue from recycling value chains, with oversight led by competent public administrations.

Finally, fisheries regulators generally agree that incentive programs can support long-term engagement and awareness among fishers, but cannot function as a standalone solution. They underline that incentives must be combined with continuous follow-up, education, prevention measures, and improved land-based waste management to address marine litter at its source and ensure durable environmental outcomes.

4.1.5 *Key points of agreement*

Summarizing, across port authorities, fishers, fishing association managers, and fisheries regulators, there is broad consensus on several key principles:

- Incentives should provide **real economic value**, not symbolic rewards alone
- **Simplicity, fairness, and transparency** are critical to participation
- **Stable, long-term funding** is essential; short-term pilots are insufficient
- **Monitoring and verification** are necessary to prevent misuse
- Reward schemes must be **complementary** to prevention, education, and better land-based waste management

4.2 Virtual Reality

The VR experience developed under the project was designed to test how an immersive, story-driven tool could influence knowledge, attitudes, perceptions, and motivational drivers related to ML across four key stakeholder groups. The results demonstrate clear differences in baseline awareness and engagement among these groups, as well as notable improvements in empathy, optimism, and action-oriented motivation after the VR exposure. Beyond these

behavioural outcomes, the VR scenarios, together with the associated empathy assessment tools, represent a key innovation within the NETTAG+ project. They provide an immersive means of understanding challenges relating to marine litter, and enhance stakeholder engagement. Their integration into demonstration and outreach activities contributes directly to NETTAG+ objectives, particularly in reducing abandoned, lost or otherwise discarded fishing gear (ALDFG) and promoting more sustainable fishing practices.

Awareness and knowledge of marine litter

Across all groups, initial awareness of marine litter was high, particularly among sectoral stakeholders (fishers, fishing association managers, policymakers, and other actors within the fishing sector), where 100% or near 100% reported already knowing “quite a lot” about marine litter. This reflects their regular interaction with marine environments and environmental regulations.

The general public exhibited slightly lower baseline knowledge, leaving greater room for learning.

Despite these high starting points, the VR experience still delivered new and valuable information, especially for stakeholders who may not witness the ecological impacts firsthand, indicating that immersive experiences can deepen understanding by presenting complex issues in vivid, experiential ways.

Perceived Public Perception of Fishers

A recurrent theme across all stakeholder groups is the positive shift in perceptions of the fishing sector.

- Among fishers themselves, 82% believed the VR could improve public opinion.
- Policymakers and other related actors reported that their own perceptions improved in 40% and 43% of cases, respectively.
- The general public showed the largest positive shift, with 56% reporting improved perceptions.

These findings highlight the VR tool’s dual role: not only as an educational device but also as a communication and legitimacy building instrument capable of humanizing fishers, illustrating their environmental challenges, and strengthening the credibility of initiatives like NETTAG+.



Attitudes Toward the Future of Marine Debris

At baseline, pessimism about the future of marine debris was widespread—especially among policymakers (80% pessimistic) and the general public (67% pessimistic). These groups likely associate marine litter with systemic challenges and long-term degradation.

After the VR experience, optimism increased across all stakeholder groups. These shifts suggest that VR can successfully communicate feasible solutions, show tangible scenarios for improvement, and reduce fatalism. The increase in neutrality also reflects a more informed and balanced view rather than ungrounded pessimism.

Motivation to Take Action Against Marine Litter

The VR experience had a robust effect on participants' motivation, particularly among the general public and non-fishing actors.

- Among fishers, motivation—already high—rose substantially, with 76% selecting 10/10 after the experience.
- The general public also showed strong improvements, shifting from a varied distribution to 56% selecting 10/10 and 28% selecting 9/10.
- “Other actors within the fishing sector” experienced a clear upward shift, with 71% selecting 10/10 postexperience.

Motivation to take action against marine litter: For actors who interact closely with both fishers and onshore operations, this increased commitment may translate into stronger and more coordinated efforts to support marine litter reduction initiatives across the value chain.

Policymakers showed consistently high motivation before and after the VR exposure, suggesting that for this group the VR acts as reinforcement rather than as a motivator.

Collectively, these results confirm the VR tool's potential to strengthen pro-environmental attitudes, reinforce commitment to ML mitigation, and support sector-wide behavioral change.

5 Conclusion

This deliverable set out to explore reward-based approaches to support fishers' voluntary collection and management of marine litter, while also examining the added value of immersive virtual reality (VR) tools for awareness raising and stakeholder engagement. Based on information co-produced involving fishers, port authorities, fishing association managers and fisheries regulators across five European countries, as well as three national and EU level policymakers, the findings point to both clear opportunities and well-defined conditions under which such strategies may be effective.

Across contexts, there is broad recognition that marine litter passively collected during fishing operations represents an external burden on fishers and that some form of compensation or incentive is justified on fairness grounds. Financial incentives that directly reduce operating costs—such as fuel-related support, reductions in port or auction fees, or payments linked to quantities of litter delivered—are consistently perceived as the most motivating. However, preferences vary by stakeholder group and national context, reinforcing the importance of flexibility and cultural sensitivity in program design. Non-financial incentives, such as recognition and awareness campaigns, are generally supported as complementary measures but are insufficient as stand-alone drivers of participation.

At the same time, the analysis highlights recurring challenges that must be addressed for reward programs to be credible and sustainable. These include securing stable, long-term funding; ensuring adequate port infrastructure for waste reception, weighing, storage, and transport; preventing fraud or misuse; and clarifying institutional responsibilities across ports, waste management actors, and public authorities. Stakeholders consistently stress that overly complex procedures, delayed payments, or unclear rules risk undermining participation, regardless of incentive size. As such, simplicity, transparency, and continuity emerge as central design principles.

Fisheries regulators and policymakers show a generally positive but sometimes conditional receptiveness to reward programs. Their support is closely tied to alignment with existing legal frameworks, avoidance of environmentally harmful trade-offs, and coherence with broader waste management, circular economy, and fisheries policies. Many emphasize that reward programs should not operate in isolation, but rather as part of integrated policy mixes that also prioritize prevention, land-based waste management, and extended producer responsibility.

On the other hand, the VR component demonstrates strong potential as an engagement and communication tool. Across all stakeholder groups, the immersive scenarios increased awareness, empathy, optimism, and motivation to act against marine litter, while also improving perceptions of fishers' environmental role—particularly among the general public. High satisfaction ratings suggest that VR can meaningfully complement traditional consultation and dissemination approaches by translating complex environmental and policy challenges into accessible, experiential narratives.

Overall, Deliverable D2.5 concludes that culturally sensitive, incentive-based reward programs—supported by innovative tools such as VR—can contribute to enhanced voluntary marine litter collection by fishers, provided they are carefully designed, properly resourced, and embedded within coherent governance frameworks. The findings offer exploratory, context-specific insights to inform future pilots, policy development, and scaling-up efforts at local, national, and EU levels. Future efforts should focus on piloting and scaling context-adapted reward schemes, supported by stable funding mechanisms, simplified administrative processes, and strong institutional coordination, to ensure long-term effectiveness and policy uptake.

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Annex 1. Participants

Table S 1. List of participants, their roles and anonymized codes.

Code	Stakeholder	Code	Stakeholder
HR01	Port Authority	PT02	Port Authority
HR02	Port Authority	PT03	Port Authority
HR03	Fishers (focus group)	PT04	Port Authority
HR04	Fishers (focus group)	PT05	Port Authority
HR05	Fishers (focus group)	PT06	Fishers (focus group)
HR06	Fishers (focus group)	PT07	Fishers (focus group)
HR07	Fishers (focus group)	PT08	Fishers (focus group)
HR08	Fishers (focus group)	PT09	Fishers (focus group)
HR09	Fishers (focus group)	PT10	Fishers (focus group)
HR10	Manager Fishing Associations	PT11	Fishers (focus group)
HR11	Manager Fishing Associations	PT12	Fishers (focus group)
HR12	Manager Fishing Associations	PT13	Fishers (focus group)
HR13	Fisheries Regulator	PT14	Fishers (focus group)
IT01	Port Authority	PT19	Fishers (focus group)
IT02	Port Authority	PT15	Manager Fishing Associations
IT03	Fishers (focus group)	PT16	Manager Fishing Associations
IT04	Fishers (focus group)	PT17	Fisheries Regulators
IT05	Manager Fishing Associations	PT18	Fisheries Regulators
IT05	Fisheries Regulator	ES01	Port Authority
MT01	Port Authority	ES02	Port Authority
MT02	Fishers (focus group)	ES03	Port Authority
MT03	Fishers (focus group)	ES04	Port Authority
MT04	Fishers (focus group)	ES05	Port Authority
MT05	Fishers (focus group)	ES06	Fishers (focus group)
MT06	Fishers (focus group)	ES07	Fishers (focus group)
MT07	Fishers (focus group)	ES08	Fishers (focus group)
MT08	Fishers (focus group)	ES09	Fishers (focus group)
MT09	Fishers (focus group)	ES10	Fishers (focus group)
MT10	Manager Fishing Associations	ES11	Manager Fishing Associations
MT11	Manager Fishing Associations	ES12	Manager Fishing Associations
MT12	Manager Fishing Associations	ES13	National Policymaker
MT13	Fisheries Regulator	EU01	EU Policymaker
PT01	Port Authority	EU02	EU Policymaker

Annex 2. Interview Questions

Table S 2 Overview of interview questions posed to fisheries sector stakeholders.

Port Authorities	Fishers	Managers Fishing Associations	Fisheries Regulators	Policymakers
Does the port have a rewards program to encourage fishers to deliver retrieved marine litter and ALDFG to the port reception facilities?	Name of preferred incentive*	Name of preferred incentive*	Name of preferred incentive*	What is your opinion on the most preferred incentives for rewarding the collection of marine litter by fishers and port authorities?***
What conditions should be in place for the port to consider implementing or participating in a rewards program?	For the incentive you ranked as most preferable, why did you choose it?*	For the incentive you ranked as most preferable, why did you choose it?*	For the incentive you ranked as most preferable, why did you choose it?*	How feasible do you consider their implementation from a public policy perspective?***
Name of preferred incentive*	What could be the main challenge(s) or risk(s) faced in implementing a rewards program in general at the port?***	How feasible would it be to implement this type of program at your port?***	How feasible would it be to implement this type of program at your port?***	What would be the main barriers to implementation (budgetary, legal, administrative)?***
For the incentive you ranked as most preferable, why did you choose it?*		What stakeholders do you think should participate in the program?***	What stakeholders do you think should participate in the program?***	Are there any potential unintended effects that should be considered?***
How feasible would it be to implement this type of program at your port?***		What could be the main challenge(s) or risk(s) faced in implementing a rewards program in general at the port?***	What could be the main challenge(s) or risk(s) faced in implementing a rewards program in general at the port?***	We would like to ask you to identify the one incentive you consider most suitable for a rewards programme, either from this list or by proposing another option you believe should be considered. Explain the reason for this selection



Port Authorities	Fishers	Managers Fishing Associations	Fisheries Regulators	Policymakers
What stakeholders do you think should participate in the program?***		What does the port need to mitigate the challenge(s) you mentioned?	What does the port need to mitigate the challenge(s) you mentioned?***	Which agency and other actors should be responsible for: Designing the programme? Implementing it? Overseeing its operation and monitoring?***
What could be the main challenge(s) or risk(s) faced in implementing a rewards program in general at the port?***		According to your experience, who should fund the rewards program?	According to your experience, who should fund the rewards program?***	Where could funding come from for the program?***
What does the port need to mitigate the challenge(s) you mentioned?		Who should oversee the design, implementation and monitoring of the program?	Who should oversee the design, implementation and monitoring of the program?	Do you consider reward-based schemes to be an effective long-term solution for managing marine litter from the fisheries sector? Why or why not?***
What measures do you consider relevant to ensure fisher's participation in reward programs in general, over time?		Do you see incentives programs as a long-term solution to managing marine litter at fishing ports? Please explain why or why not.	Do you see incentives programs as a long-term solution to managing marine litter at fishing ports? Please explain why or why not.***	Is there anyone else within the EU government who you think I should speak with, especially someone who might see this differently from you?
		Would you like to mention any other considerations regarding marine litter management in ports or rewards programs for fishers?	Would you like to mention any other considerations regarding marine litter management in ports or rewards programs for fishers?	

* Questions used for the assessment of the “Best Practice” for a potential Fisher’s Reward Program.

** Questions used for the assessment of the “Receptiveness of fisheries regulators and policymakers”.

*** Questions used for the assessment of stakeholders “Recommendations”.



Annex 3. White Paper





WHITE PAPER: Fishers’ Reward Programs for Marine Litter Collection

Evidence, Best Practices and Policy
Recommendations from the fisheries
sector



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the European Union**



**UK Research
and Innovation**

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1 • INTRODUCTION: Why Reward Programs Matter

Marine litter remains a persistent environmental and socio-economic challenge across European seas. It contributes to ecological degradation, ghost fishing, navigation hazards and increased costs for port management, while also placing additional operational burdens on fishers. During routine fishing activities, fishers frequently retrieve marine litter passively, incurring costs related to fuel consumption, lost fishing time, on-board storage, and waste delivery at ports—costs that are rarely compensated and that often originate from pollution sources outside the fishing sector itself.

In recent years, there has been growing interest in **reward-based** or **incentive-based approaches** as a potential policy instrument to support the **voluntary collection and proper management of marine litter by fishers**. Such approaches are increasingly framed not only as environmental measures, but also as mechanisms to promote fairness, recognize fishers' positive environmental contributions, and encourage collaboration between ports, authorities and the fishing sector. However, the design of effective reward programs raises important questions regarding feasibility, sustainability, governance arrangements, and alignment with existing fisheries and waste management policies.

Within this context, the EU-funded NETTAG+ project ("Preventing, Avoiding and Mitigating Environmental Impacts of Fishing Gears and Associated Marine Litter") seeks to contribute to emerging policy debates by strengthening the evidence base on socially acceptable and institutionally viable pathways to reduce fisheries-related marine litter. As part of this effort, Deliverable D2.5 explores **fishers' reward programs as a potential policy option**, focusing on how different stakeholders perceive various **incentive mechanisms**.

This white paper synthesizes the key findings of that work. It is important to stress that the study presented here is **exploratory in nature**. The NETTAG+ project gathered qualitative evidence by engaging actors across the fisheries governance system to understand:

- Which types of incentives are perceived as most attractive or fair
- What challenges and risks stakeholders anticipate
- Which institutional arrangements are considered necessary for future reward programs
- How receptive fisheries regulators and policymakers might be to such approaches

The analysis draws on workshops, interviews and policy dialogue conducted in **Croatia, Italy, Malta, Portugal and Spain**, involving fishers, port authorities, managers of fishing associations, fisheries regulators and national and EU-level policymakers. By comparing perspectives across countries and stakeholder groups, the study identifies both context-specific differences and converging views relevant for future policy development.

This white paper therefore does not advocate for a specific incentives. Rather, it provides an evidence-based foundation to **inform future research, policy design and pilot initiatives**, by clarifying stakeholder preferences, identifying common constraints, and outlining key principles that should guide any future experimentation or scaling of reward-based schemes for marine litter collection within European fisheries. In doing so, the white paper aims to support policymakers, fisheries authorities and port managers in moving from exploratory insights toward **carefully**

designed, context-sensitive pilots that can be evaluated and adapted before any broader implementation is considered.

2. Approach and Evidence Base

The evidence presented in this white paper is based on a **qualitative study** carried out between September 2024 and March 2026 in five European countries (Croatia, Italy, Malta, Portugal and Spain).

Data collection involved:

- Workshops with **174 fishers**³ (33 in Croatia, 28 in Italy, 34 in Malta, 63 in Portugal and 21 in Spain), representing different fleet segments
- Semi-structured interviews with **15 port authorities, 11 managers of fishing associations, 4 national fisheries regulators, 1 national policymaker, and 2 EU-level policymakers**

Stakeholders were invited to assess and discuss **potential reward mechanisms identified through a global literature review on rewards-based litter management programs**, focusing on perceived preference, feasibility, challenges, solutions, implementations, and governance implications.

3. Perceived Best Practices and Challenges for Reward Programs

3.1 Overview of Incentives

Stakeholders assessed a range of potential incentives, including:

- Fuel subsidies or discounts
- Reductions in port fees or fish auction costs
- Payments proportional to the quantity of litter delivered
- Discounts on fishing gear
- Recognition and awareness-raising measures
- Payments facilitated through waste management companies

Preferences varied by country and stakeholder group, but recurring patterns emerged.

³ A workshop with industrial large-scale fisheries (LSF) were excluded from this study because storing collected waste onboard large vessels for extended periods is impractical, particularly for long-distance fleets operating from or landing catches in non-EU ports. In addition, marine litter is mainly concentrated in coastal areas where LSF do not typically operate, with lower concentrations in open seas except for specific hotspots. This was confirmed by interviews conducted with LSF fishers within [NetTag project](#).

3.2 Country Perspective: Stakeholder Preferences on Potential Incentives and Associated Challenges

This section summarizes, by country, the **main incentives identified as preferable by stakeholders** and indicates **which stakeholder groups selected them and in what numbers**. These findings reflect stakeholder perceptions gathered through workshops and interviews, rather than evaluations of implemented reward programs.

Croatia

The most popular incentive converged strongly around **fuel-related incentives**, reflecting the high operational costs faced by fishing vessels.

- **Fuel subsidies or fuel-related discounts** were selected as the preferred incentive by **29 fishers, 2 port authorities, 1 manager of a fishing association**

Stakeholders highlighted fuel as the dominant operating expense and therefore the most immediately meaningful form of compensation for passively collected marine litter.

Additional incentives received more limited support:

- **Discounts on sustainable fishing gear**, selected by **4 fishers**, seeing clear benefits for both their work and the environment.
- **Payments based on the amount of litter delivered**, preferred by **2 fishing association managers**, who emphasized proportionality and fairness.
- **Reductions in port fees** were selected by **1 fisheries regulator**, who pointed to their relevance in offsetting fixed operational costs but also underlined national regulatory constraints.

Across all stakeholder groups, commonly anticipated challenges included securing stable funding, limited port-side infrastructure, unclear institutional responsibilities and the need for robust monitoring to prevent misuse or risks of fraud/abuse. Specific to fuels subsidies, it was also mentioned that fuel subsidies face coordination difficulties across ministries and financial dependence.



In Italy, fishers consistently described fuel costs as their primary economic concern and viewed fuel-related incentives as the most tangible and motivating option:

- **Fuel subsidies or discounts** were overwhelmingly preferred by **28 fishers**

Other stakeholder groups expressed different preferences:

- **Reductions in port fees** were selected by **2 port authorities and 1 fisheries regulator**

These actors considered port-managed incentives realistic and motivating, provided they are supported by clear regulatory frameworks.

- **Reductions in fish auction costs or preferential access to first sale** were selected by **1 manager of a fishing association**, who emphasized compensation for lost fishing time and logistical burdens associated with waste delivery.

Specific to fuels subsidies, fishers recognized that there might be technical challenges in ensuring fair allocation due to differences in vessel engines and consumption.



Across Malta, diverse stakeholders revealed strong support for fuel-related incentives, alongside interest in effort-based payments and private-sector involvement.

- **Fuel subsidies or discounts** were selected by **25 fishers and 1 port authority**

Fishers highlighted rising fuel prices and limited existing compensation mechanisms as key reasons for this preference.

- **Subsidies based on the amount of litter delivered** were selected by **10 fishers and 1 manager of a fishing association**, who valued the simplicity and direct link between effort and reward.
- **Payments by waste management companies** were selected by **2 managers of fishing associations**, who stated that with this option they would most probably have more flexibility to choose how to spend the support.

Key challenges identified across Maltese stakeholders included limited space on vessels and in ports, lack of designated disposal points, administrative complexity and the need for strong monitoring systems (e.g. CCTV) to ensure trust and compliance.



Portugal showed the **most diverse distribution of preferences**, reflecting variation across fleet segments, ports and institutional roles.

Among fishers:

- **Fuel subsidies or discounts** were selected by **31 fishers**, who described fuel as the most significant operational cost affecting profitability.
- **Subsidies proportional to the amount of litter delivered** were selected by **20 fishers**, perceived as fairer and easier to understand.
- **Discounts on fishing gear** were selected by **6 fishers**, primarily as a complementary rather than primary incentive.

Among institutional actors:

- **Recognition and awareness campaigns** were selected by **3 port authorities**, who saw reputational incentives as low-cost, complementary tools.
- **Reductions in port fees** were selected by **1 port authority** and **1 manager of a fishing association**, who viewed these incentives as feasible within existing administrative structures.
- **Reductions in auction costs or right to first sale** were also selected by **1 port authority** and **1 manager of a fishing association**.
- **Payments by waste management companies** were selected by **2 fisheries regulators**, who argued that compensation should be embedded within waste valorization and recycling system.

Across all groups, stakeholders identified logistical and organizational complexity, verification and



Spanish stakeholder preferences reflected a mix of economic and administrative considerations, with strong support for effort-based payments.

- **Subsidies based on the amount of litter delivered** were selected by **9 fishers, 2 managers of fishing associations**, who emphasized clarity, immediacy and proportionality between effort and reward.
- **Reductions in port fees** were selected by **1 port authority, 5 fishers, 1 national policymaker**, who viewed port-managed incentives as comparatively stable and institutionally robust.
- **Fuel subsidies or discounts** were selected by **1 port authority, 5 fishers**, though concerns were raised regarding budgetary feasibility.
- **Reductions in fish auction costs or preferential access to first sale** were selected by **1 port authority and 4 fishers**, mainly as indirect compensation.
- **Recognition and awareness campaigns** were selected by **2 port authorities**, who stressed the importance of avoiding excessive commercialization of litter collection.

Main challenges were financial sustainability and economic burden, administrative complexity and limited port capacity/infrastructure to manage controls, fraud, monitoring and measurement of collected waste. Specific to payments by waste companies, it was mentioned that small waste contractors might have limited capacity to absorb additional systems or waste volumes, warning that a surge in passively collected marine litter could trigger extra disposal costs, as contractors may require additional payments beyond standard MARPOL waste services.

SHARED CHALLENGES AMONG PARTICIPANTS

Across port authorities, fishers, fishing association managers, fisheries regulators, and policymakers there is broad consensus on the following challenges:

- Lack of Stable and Long-Term Funding
- Insufficient Port Infrastructure and Logistical Capacity
- Administrative Complexity and Bureaucratic Burden
- Monitoring, Verification and Risk of Misuse
- Unclear Institutional Roles and Responsibilities
- Ensuring Equity Across Fleet Segments and Ports

4. Recommendations for Future Fishers' Reward Programs

This section presents key recommendations derived from evidence gathered through stakeholder consultations in NETTAG+, also providing insights into how to mitigate the identified challenges. The recommendations combine **country-specific considerations, insights from EU-level policymakers, and key points of agreement across stakeholder groups**. Together, they provide structured guidance for policymakers, fisheries authorities and port managers considering future pilot initiatives and subsequent scaling efforts.

4.1 Country-specific considerations

Usage of closed-circuit television camera (CCTV), staff verification, specialized inspectorates, smart containers and clearer role allocation.

The **Environmental Protection and Energy Efficiency Fund** is seen as a potential funding source. They recommend involving municipalities, waste-management companies, home-port fishers and national ministries (Agriculture, Environment, Economy).

Stakeholders recommend **national-level planning and financing**, with implementation and monitoring at municipal level, supported by clear legislation, adequate infrastructure and secure waste-collection logistics.



Consolidating waste management under a central entity such as **Docapesca**, supported by inspections, awareness-raising and institutional continuity.

They highlight weaknesses in waste tracking and express trust in fishing associations and port authorities for program oversight.

They recommend funding through **Docapesca, MAR2030**, or similar schemes, with Docapesca leading design, implementation and monitoring.

Portugal

Croatia

Italy

Need for strong monitoring (including CCTV), clear responsibility for waste-facility financing and improved port infrastructure. Proposed mitigation measures include dedicated disposal spaces, staff verification, logbooks and streamlined procedures.

Broad participation involving cooperatives, councils, the **Environment and Resources Authority (ERA)**, **WasteServ Malta Ltd**, Transport Malta and the Fisheries Department. EU funding is generally preferred, complemented by national support.

Secure, monitored infrastructure and mixed models combining subsidies with payments by waste companies. Funding should primarily come from public sources, notably **European Maritime, Fisheries and Aquaculture Fund (EMFAF)**, complemented by private companies motivated by Corporate Social Responsibility (CSR).

The national policymaker recommends small-scale, adaptive pilots, strong scientific support for calibration, and broad stakeholder involvement, with ports and public administrations leading design and implementation.

4.2 EU Policymakers

Two representatives from EU institutions emphasize that any future Fishers' Reward Program must be **carefully designed to ensure fairness, simplicity and policy coherence**. A central concern is the need to **clearly distinguish passively collected marine litter from fisher-generated waste**, ensuring that incentives apply exclusively to the former. Robust verification mechanisms are therefore considered essential to maintain legitimacy and avoid unintended effects.

Both policymakers highlight **bureaucratic complexity and slow payment systems** as major risks to participation. They stress that incentives will only be credible if administrative procedures are **agile, low-burden and timely**, avoiding lengthy legal processes or delays that would shift costs back onto fishers. Challenges related to verifying litter origin, calibrating fair compensation—especially when fishers are not actively fishing—and aligning incentives with existing regulatory frameworks are also noted.

To address these issues, EU policymakers recommend building on **existing EU policy frameworks**, particularly the **Port Reception Facilities Directive** and the **Single-Use Plastics Directive**, to reduce regulatory fragmentation and avoid creating parallel systems. **Pilot testing and business-model experimentation** are strongly encouraged before any scaling-up, allowing feasibility, costs and unintended effects to be assessed in practice.

In terms of governance, EU policymakers should retain **strategic oversight and policy alignment**, while implementation and monitoring must ensure transparency, verification and demonstrable environmental impact. Relevant stakeholders should include environmental agencies at Member State level, fisheries ministries and organizations representing small-scale fisheries, with a potential role for private entities in early stages.

Regarding funding, a **phased approach** is recommended. It was suggested to start with **private funding mechanisms** to avoid initial bureaucratic constraints, followed by gradual integration of public funding once schemes demonstrate effectiveness, while the other supports public involvement through established EU and national funding frameworks. Linking reward schemes to complementary initiatives (e.g. Blue Carbon or similar mechanisms) is also suggested.

SHARED RECOMMENDATIONS AMONG PARTICIPANTS

Across port authorities, fishers, fishing association managers, fisheries regulators, and policymakers there is broad consensus on several key principles:

- Adequate port infrastructure for waste reception, weighing, storage, and transport are needed
- Incentives should provide **real economic value**, not symbolic rewards alone
- **Simplicity, fairness, and transparency** are critical to participation
- **Stable, long-term funding** is essential; short-term pilots are insufficient
- **Monitoring and verification** are necessary to prevent misuse
- Reward schemes must be **complementary** to prevention, education, and better land-based waste management

5. Receptiveness

Despite differences in roles and national contexts, several **clear points of agreement** emerge across fisheries regulators, national policymakers and EU-level actors. However, overall receptiveness can be characterized as **positive**, with strong support for moving forward through carefully designed pilots rather than immediate large-scale implementation.

5.1 Fisheries Regulators and national policymakers

Fisheries regulators across countries show a **generally high level of openness** to reward programs, viewing them as a potentially useful complement to existing marine litter and waste-management policies.

However, their receptiveness is consistently framed by:

- The need for legal clarity and alignment with national and EU regulations
- Concerns about waste traceability, quantification and verification
- The requirement for adequate infrastructure and institutional capacity, particularly in ports with limited resources
- A strong preference for long-term, structured programs rather than isolated or project-based initiatives

Many regulators emphasize that reward programs can support awareness and behavior change but **cannot function as stand-alone solutions** and must be embedded within broader waste-management and fisheries governance frameworks.

5.2 EU-Level Policymakers

EU-level policymakers express **conditional but clear receptiveness** to Fishers' Reward Programs as a legitimate response to the external costs borne by fishers when passively collecting marine litter.

Their support is contingent on several factors:

- A **clear distinction** between passively collected marine litter and fisher-generated waste

- **Low-burden, fast and simple administrative procedures**, avoiding delays that could discourage participation
- Alignment with **existing EU frameworks**, particularly the *Port Reception Facilities Directive*, the *Single-Use Plastics Directive*, and *Marine Strategy Framework Directive*, to avoid regulatory fragmentation.
- Incentives must be carefully designed **considering environmental implications**, to avoid becoming unintended subsidies (e.g., contribute to fishing overcapacity and, ultimately, to the overexploitation of fish stocks).

EU policymakers strongly encourage **pilot testing and phased experimentation** before scaling up, including testing different funding and business models. They support a governance model where EU institutions retain strategic oversight, while implementation and monitoring demonstrate measurable environmental outcomes.

6. From Exploratory Evidence to Future Pilots

The findings offer exploratory, context-specific insights to inform future pilot initiatives, policy development, and scaling-up efforts at local, national, and EU levels. Future work should increase the number of interviews with fisheries sector stakeholders in each country. Expanding participation—particularly across targeted fleet segments and port types—would enable a more detailed and representative understanding. This would support the subsequent piloting and scaling of context-adapted reward schemes, underpinned by stable funding, simplified administrative processes, and strong institutional coordination, to ensure long-term effectiveness and policy uptake.

7. Conclusions

7.1 Policy Messages

This white paper demonstrates that reward programs are perceived as a promising tool to support fishers' voluntary collection of marine litter, but only under clearly defined conditions. Stakeholders call for cautious, evidence-based progression from exploratory research to pilot implementation, anchored in robust governance structures and policy coherence.

Reward programs should not be seen as standalone solutions, but as one component of integrated marine litter strategies that combine prevention, waste management, economic incentives and stakeholder engagement.

7.2 Key Policy Recommendations

- 1) **Use exploratory evidence to design targeted pilot programs, not one-size-fits-all schemes:**

Preferences, constraints and institutional capacities vary across countries, ports and fleet segments. Future action should therefore prioritize **context-specific pilot programs**, informed by exploratory evidence, rather than one-size-fits-all incentive models.

2) Ensure stable, long-term funding before scaling

Funding stability is a critical condition for credibility and sustained participation. Reward programs should rely on predictable, long-term funding mechanisms before moving beyond pilot phases, as continuity is widely seen as more important than incentive size.

3) Embed incentives within existing fisheries and waste frameworks

Reward schemes should be integrated into existing national and EU policy structures, reducing administrative duplication, strengthening legal certainty and improving coherence with fisheries and waste-management objectives.

4) Prioritize low-burden administration, transparency and monitoring

Simple procedures, timely payments and transparent rules are essential to participation. Verification systems should be **robust but proportionate**, ensuring credibility without imposing excessive administrative burdens on fishers or ports.

5) Maintain continuous dialogue with fishers and port actors

Ongoing engagement with fishers, port authorities and fishing organizations is essential throughout design, piloting and scaling phases. Continuous dialogue supports trust, improves program design and facilitates long-term policy uptake.



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