

SeaPaCS_Policy suggestions for the management of plastics collected in the Sea by Fishermen in Anzio - Rome (Italy)

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SeaPaCS – Participatory Citizen Science against Marine Pollution and Climate Change

EU Citizen Science Initiatives funded by IMPETUS4CS project (WIDERA 2021-ERA-01, Grant Agreement No. 101058677)

2023



Table of Contents

1. Context of research.....	2
2. Policy suggestions elaboration.....	2
2.1 Fishing for Plastic	3
2.2 Interviews with Fishermen.....	4
2.3 Documentation activity.....	8
Annex I . Personal data collection and management procedure	16
Annex II. Individual interviews concept maps	17

1. Context of research

From June 2023 to November 2023 an interdisciplinary team led by Chiara Certomà, social geographer (DIGGEO@ESOMAS laboratory, University of Turin) and co-coordinate by Feerico Fornaro (Lega Navale Italiana) and Luisa Galgani (Division of Biological Oceanography of the GEOMAR Helmholtz Centre for Ocean Research in Kiel, Germany, and University of Siena, DBCF) with the assistance of Alessio Corsi (University of Turin) conducted the SeaPaCS - “Participatory Citizen Science against marine pollution” project.

The project was intended to raise awareness about the consequences of marine plastic pollution on local biodiversity and to trigger transformative local action for sustainability-oriented behaviours in the small coastal city of Anzio (Rome, Italy). Two research questions have been specifically addressed:

- What microbes are present in the Mediterranean plastisphere and how are they affecting the biodiversity of the marine ecosystem?
- How can the experience of sea workers and amateurs help decrease plastic debris and promote sustainable behaviours?

The present document is dedicated to answering the second research question and presenting policy suggestions for improving coastal and maritime sustainability management in the local context.

SeaPaCS combined natural and social science research to engage multiple citizen groups (fishermen cooperatives (including migrant workers), students and teachers, social and environmental associations, sailors and divers, scientists, seasonal residents, media, video makers and photographers) in “collaboratorium” meetings, training sessions and co-production of tools for collective sea-going expeditions in the coastal waters (for plastic samples collection for microbial life analysis, interviews and video-documentation), and the organisation of outreach activities (e.g. video and photo expositions, media coverage, redaction of follow-up plan). The project operated in a social context where citizen groups are already engaged with marine plastic pollution; however, knowledge and results achieved up to now have been unsystematic and unrelated to scientific knowledge. Anzio (60 km S of Rome, 50.000 inhabitants), a local economy highly dependent on the sea (fishing, commercial boating, and tourism) and where the former City Council was dismissed due to speculative investments and a new technical government is working to bootstrap a sustainable future for the city.

2. Policy suggestions elaboration

In order to elaborate policy suggestions that could value the experience and expertise of sea-going people and sea-workers, during the kick-off meeting (called First Scientific Aperitif) on the 1st of July 2023 we invited participants to present themselves and describe their experience with plastics in the sea.

The fate of plastic in the sea immediately appeared as a common concern, and local associations described beachcombing initiatives and fishermen reported on their daily frequentation with marine plastics by further introducing the troubling issue of how to collect and recycle the plastic they daily collect.

The fishermen cooperatives “Fanciulla D’Anzio” (spokesperson Lorenzo Colantuono, founder of the fishermen association against plastic in the sea called “Innocenziana”) and “Concordia” (representative Angelo Grillo) that represent the totality of trawling fishermen boats in Anzio took part in the kick-off meeting and representatives or members of both took part in all the phases of the SeaPaCS project. They actively promoted meetings and advanced specific suggestions on how to conduct the multi-stakeholder dialogue, involving SeaPaCS research and documentation team, plastic sector businesses (notably Massimo D’Eramo, president of the local plant D’Eramo Imballaggi) and waste recycling sector (Francesco Traversa, COSMARI) and the sea lawyer Andrea Petragani Ciancarelli, together with the technical team of Environmental Department of the City Administration led by Eugenio Monaco. Participants offered their expertise and experience toward the common aim of cleaning up the harbour, collecting and recycling plastics (and other waste) in the sea during fishing activities without further costs

for fishermen and for restoring the virtuous process of waste collection at the harbour. Nevertheless, they are not responsible for the conclusions described in the present policy-suggestion document – whose responsibility for contents is entirely of the SeaPaCS coordinators.



Fig.1 Visual storytelling of the contributions presented by participants to the First Scientific Aperitif

To the end of documenting and contributing to address the reported problem, SeaPaCS team realised the activities described below.

2.1 Fishing for Plastic

On the 12th of July, researchers of the SeaPaCS and the film-maker crew of the independent video-documentary society “Raw-News”, are leaving from the port of Anzio on the fishing boat Paola Madre owned by Angelo Grillo together with the fishermen crew, for a marine plastic search and recover trip. SeaPaCS team conducted on board interviews during the usual fishing activity and documented the work performed by the fishermen. The “experts of the sea” are fundamental witnesses on the marine plastic pollution problem and on the eventual recovery and disposal of the plastic encountered at sea. The MV Paola Madre is a 20m long fishing boat owned by Capt. Angelo Grillo. The crew is composed by Capt. Grillo and two fishermen. During the night, three trawl catches were made in an area between 3 and 20 nautical miles from the coast. Every trawl was dragged for about 10 nautical miles for a duration of three to four hours each. The abundance of plastic was recorded for every catch, mainly fragmentary and mostly consisting of containers and plastic films. In this time of the year little trash was located and recovered due to little input from rivers for the lack of rains. The fishermen reported that, during the wintertime, the trash recovered by the boats is about 70% more than the one recovered in the summertime due to stronger marine currents and rain events.

It is worth pointing out that the boat trip was made in an area of high trawling intensity, removing macroplastics too.

During the fishing activities, the SeaPaCS researcher interviewed Capt. Angelo Grillo and the crew members who confirmed that the presence of plastic and/or marine litter in general is significant and they can bring back to port at least a big bag of trash every two days. The fishermen reiterated that the typology of plastic fished is mainly composed of plastic bottles, but all the litter recovered and brought back must go to the general waste bin due to the lack of an “eco-centre” in Anzio where waste can be delivered according to its typology. Moreover, the fishermen reported that abandoned, lost or otherwise discarded fishing gears including ropes can cause major problems to navigation as these intertwine with the

propeller, while plastic films could clog the engine cooling system causing its overheating. These damages can cost the fishermen thousands of Euros, therefore plastic, they note, causes not only an environmental damage, but also an economic one.

In general, the fishermen stated that they are happy to recover plastic and marine litter to help to keep our seas clean, but they also point out that the presence of a garbage delivery system in the port would help, as well as little incentives could increase the participation in the waste collection at sea.



Fig.2 Flyer of the event

2.2 Interviews with Fishermen

The open dialogue activity entailed 8 interviews with trawling fishing boat captains and sailors at the Anzio harbour (on the 13.08.2023), 1 shipbuilder, 1 trawling fish captain in the nearby coastal city of Nettuno and on the 29.07.2023 SeaPaCS team interviewed 3 fishermen at the “Piccola Pesca” harbour.



Fig. 3 Interviews at the “Piccola Pesca” harbour (photo C.Certomà)

By adopting an open interview protocol consisting in three leading questions (1. What is your experience with plastic in the sea during your working activity? 2. Have you noticed any difference in time and what are the main problems this causes? 3. What do you think about the collection system at the harbour and how would you improve it to grant fishermen an active role in the ocean safeguard?), the SeaPaCS team allowed interviewed contributors to express their vision and opinion and expand on cognate topics they felt as more relevant. Interviews have been audio or video recorded (under explicit and written consent) and than managed as specified in Annex I. Moreover, fishermen have been asked to contribute with their own multimedia recording of the plastic in the sea experience.



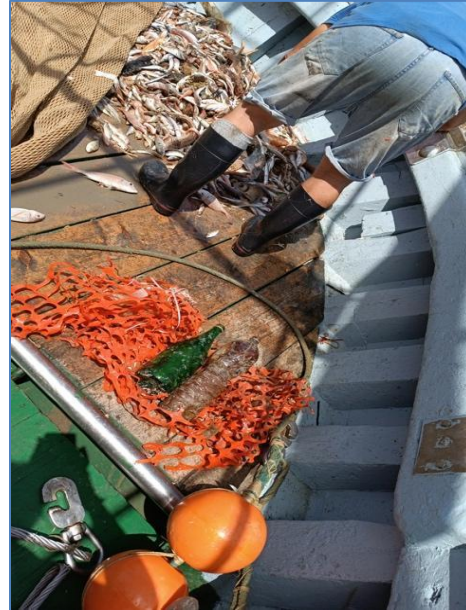


Fig. 4 Waste caught at the sea (photo by fishermen)

The interviews have been analysed via the production of single concept maps (see Annex II) and then integrated into a single concept map summarizing key information and opinions about the issue of plastic waste collected in the sea.

Main clusters of discussion have been identified and include: modification in time, quantity, types of waste, origin, related actions and effects. Fishermen signalled that while the presence of plastic in the sea increased in the last decades (more visibility in shallow coastal waters) in the backdrops where trawling fishing happens, the quantity is minor. Many of the objects found in the water seem to derive from fishing activities themselves (ghosts, octopus tubes, cables...) or are likely to reach the sea via rivers and inner waterways. In terms of related actions, fishermen reported on the several attempts, in the past years, to create an efficient system for the collection of plastic and waste in general at the harbour but equally reported that these all failed. Therefore they auspicated and confirmed their willingness to collaborate to the creation of a collective waste disposal area at the harbour, with dedicated space for each boat to dispose large or hazardous waste. In terms of general policy, they further claim the importance of their work in cleaning up the sea and suggest this could be even more efficient with small incentives and acknowledgment from public institutions (as it is, for instance, the case for the support measures for multifunctionality of agriculture in the EU Common Agricultural Policy).

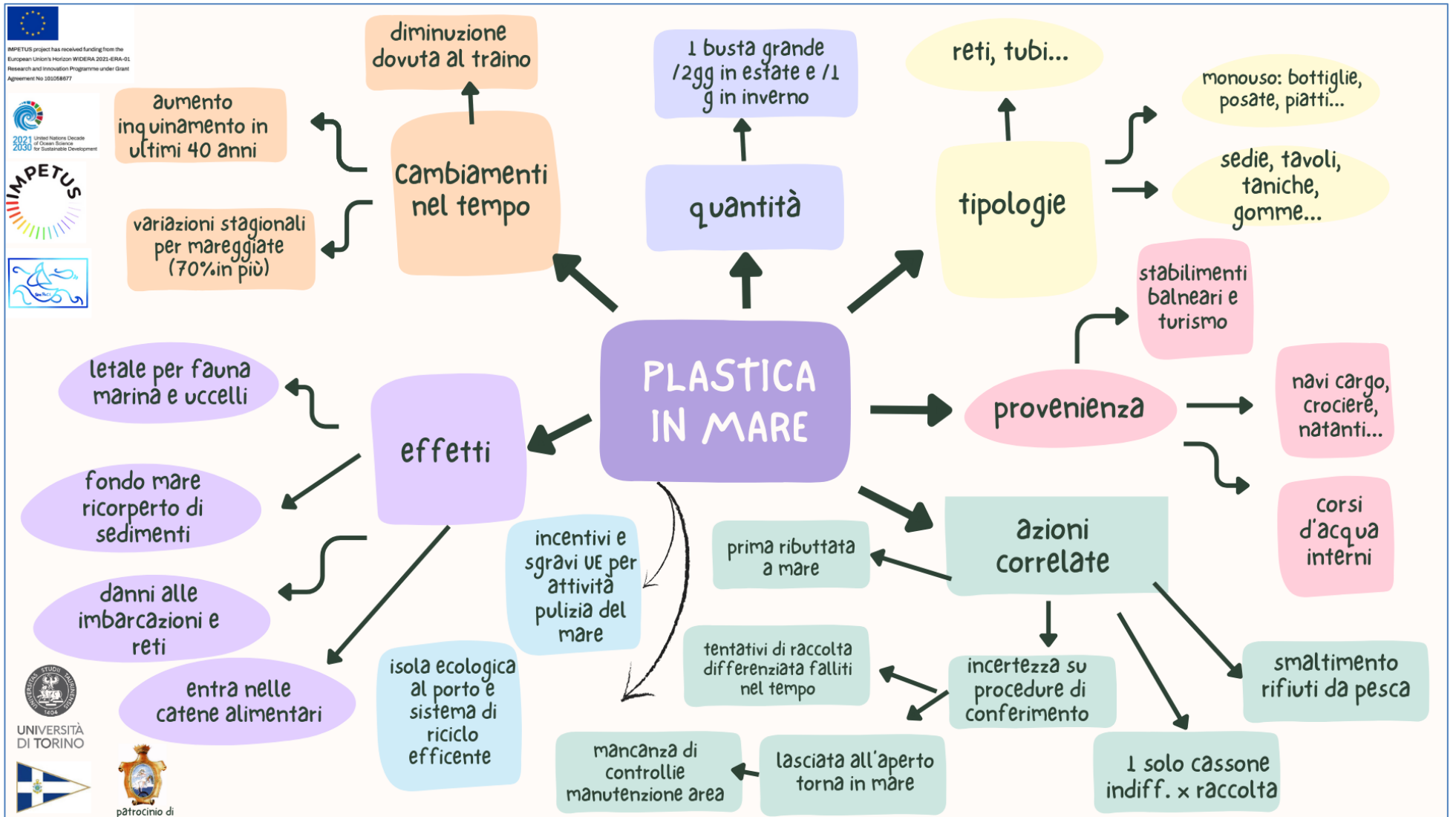


Fig. 5 Concept map resulting from the elaboration of the interviews to Fishermen

2.3 Documentation activity

In July 2023, the SeaPaCS team in collaboration held ad-hoc colloquium with selected representatives of the fishermen to focus on the possible solutions for cleaning up and restoring the fishermen harbour while triggering fishermen collection of plastic in the sea. The questionnaire and the collected answers are reported here below:



Questionnaire for fishermen of the Port of Anzio Policy Suggestions Eco Center

Q: What has been done so far at the port in Anzio for the issue of the collection of waste brought from the sea?

A: Previously there was an ecological island, but it was damaged. Moreover, this was only good for certain types of materials. There was also a roll-off, that is, a large container for larger materials open above. Both the ecological island and the roll-off were present before covid; Subsequently, everything was removed and the containers were never returned to the port. The fishermen and their representatives tried to restore this ecological island by asking the region and the municipality but to no avail.

Q: How much waste do you take per day (for example, number of black bags or estimated weight)? What percentage of these is plastic? What other materials do you find? What kind of plastic do you collect? What size? Which recognizable objects do you find the most?

A: You collect about one black bag per day for each boat; In total the fleet consists of 20 fishing boats of various sizes. On average, between 10 and 20 kg of waste are taken from the sea every day, 80% of which is represented by plastic.

The type of recognizable objects caught includes above all bottles, plates, cutlery, plastic cups, various objects that come from the ground of small dimensions, absorbents, many wrappers, shredded pieces no longer recognizable of the size of a few centimeters. Larger objects such as tires, chairs, tables, deckchairs, fenders, coffee tables are also frequently fished.

Q: Have you noticed seasonal or monthly variations in the amount of waste and plastic collected on the total catch?

A: There are seasonal variations, because the largest objects and the largest amount of waste are collected in winter because the contribution of plastic to the sea is mainly due to rivers. For this reason, there is a greater presence of plastic within three miles, just under three to six miles, while more than six miles is found in much smaller quantities. In addition, rough seas and storm surges move the waste accumulated on the bottom.

Where fishing boats are found less during periods when the sea is more frequented.

Q: Where can you dispose of plastic and waste currently collected and produced?

A: The black bags containing the waste found at sea are thrown into the only undifferentiated bin that is present at the port (before you could not bring them ashore because the fine was made).

Q: What about self-generated waste (i.e. produced during your normal activity), what kind of waste do you produce? What percentage of this is plastic and what is it?

A: As far as self-generated waste during fishing is concerned, these are mainly nylon and plastic nets, steel and iron cables, polystyrene castings and boxes. Each of the twenty paranze produces on average 100, 150 kg per month of this type of waste. 30.40 % consists of metal, especially iron, which is found in cables. There is no collection system for this waste. In fact, on the extreme tip of the port there is a large accumulation of abandoned nets.

Q: What particular self-generated waste would need suitable disposal facilities that are currently missing? Are you aware of any industry agreements currently active for their disposal?

A: The steel and iron cables that are left on the ground are collected by a company, which then resells them, but without any formal agreement.

The engine oil of the boats is changed once a week and, currently, it is kept on the boat. When there is too much, each captain calls a company in charge of Frosinone who comes to collect it, there are no additional costs since the cost of disposal is included in the cost of the product purchased. Before there was a single tank that was located at the port and everyone could pour the used oil in there and, when it was full, it was the cooperatives that called the company in charge of emptying the tank. This is still referred to as the best system because it is centralized. There were also problems because the emptying did not take place regularly, and because there were no access controls, so everyone came to spill the used oils in there, including restaurants: it therefore created a problem of accumulations and lack of identification of responsibility, which is why it was finally removed.

As for the polystyrene boxes, these are bought by individual fishermen and then sold at the market together with the fish contained. Some waste is produced that currently ends up accumulated at the port on the quay, and it is mainly those who buy and sell the "mazzama", mostly citizens of foreign origin, who produce this type of waste. There have been problems because recently this accumulation of boxes was set on fire at the port itself.

Among the self-produced waste there are also batteries that must be changed every two years per boat. A further discussion should be made for the pipes for fishing octopuses that should be under the coast. Octopus fishing is legal, but the rule says that the pipes must be taken away after two days, instead they often remain in the water for a very long time, breaking and often dispersing.

Q: What facilities for collected and self-generated waste would be most useful to the port?

A: The ideal prospectus for an ecological island could include dedicated bins for plastic, nets and iron, a bin for the collection of used oil, an undifferentiated bin for smaller waste, a roll-off for bulky waste, an area for the collection of polystyrene, and one for the collection of batteries.

This area should be closed and fenced, equipped with security cameras, and the keys should be entrusted to the presidents of the cooperatives.

In August 2023, Raw-News visually documented the presence of plastic and general waste at the fishermen's harbour.

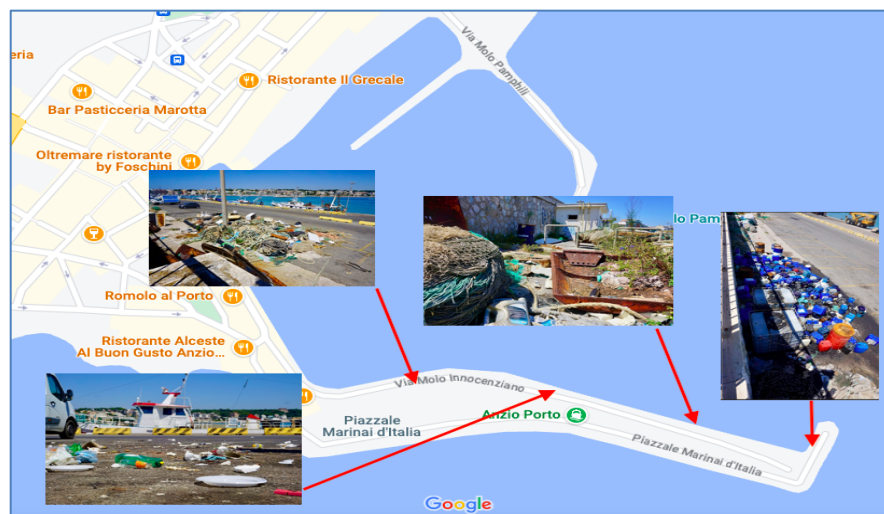


Fig.6 Fishermen's harbour and location of dumping areas (photo G. Lupinacci)

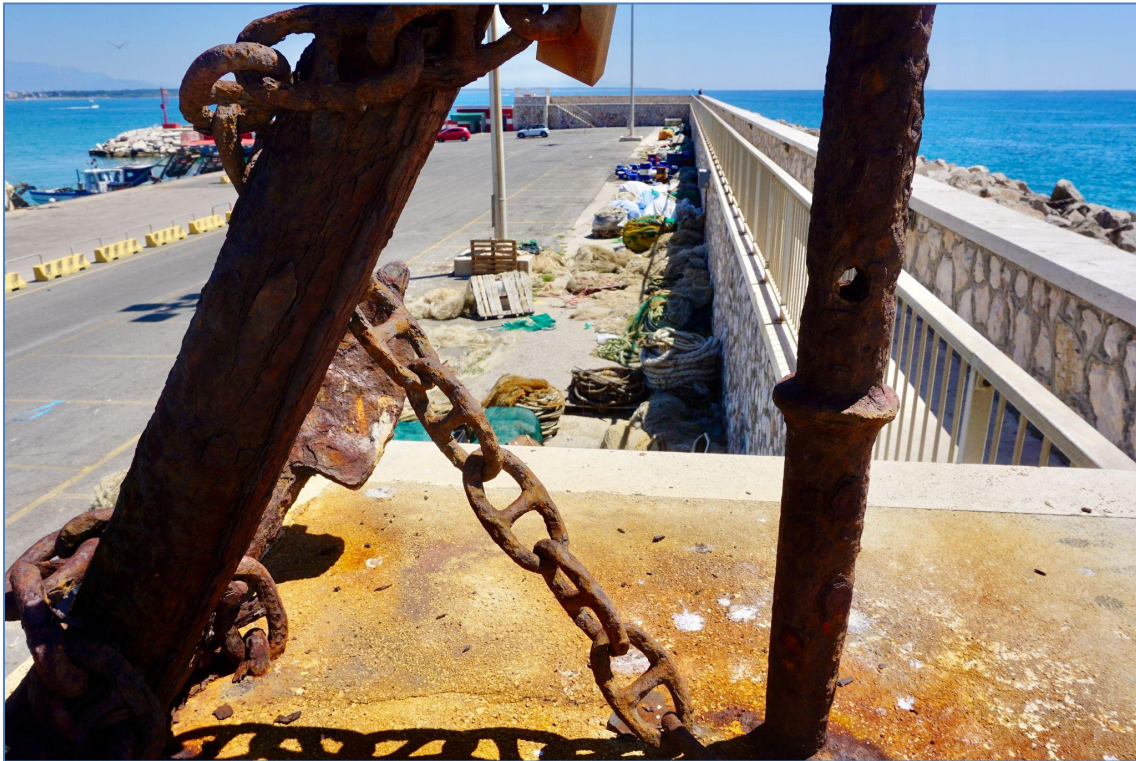


Fig.7 The final part of the fishermen's harbour from above (photo G. Lupinacci)



Fig.8 Daily waste in the fishermen's harbour (photo G. Lupinacci)



Fig.9 Nets, cables and abandoned hazardous waste the fishermen's harbour (photo G. Lupinacci)



Fig.10 Metal waste at the fishermen's harbour (photo G. Lupinacci)



Fig. 11 Abandoned general waste and rest of fishing activity (photo by G. Lupinacci)

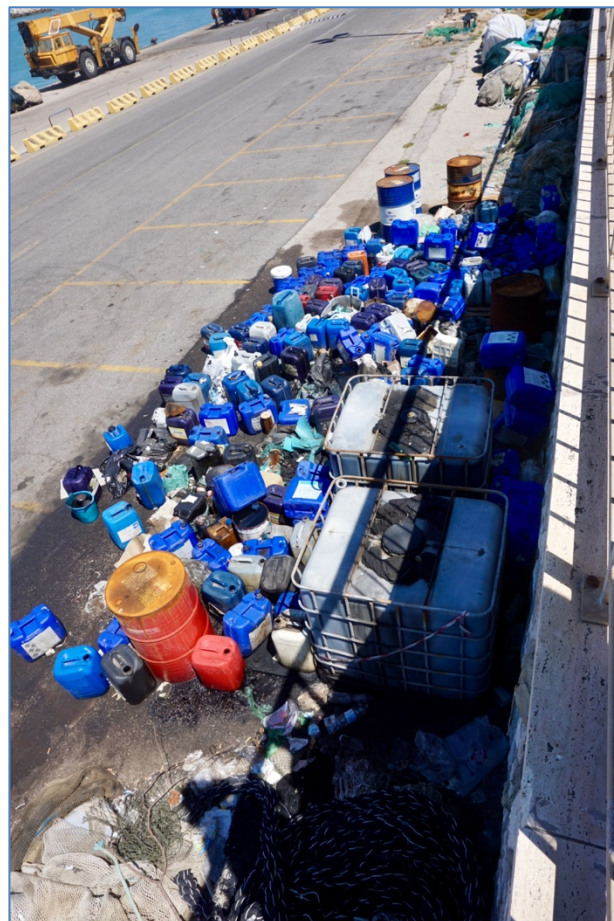


Fig.12 Used engine oil abandoned in the fishermen's harbour (photo G. Lupinacci)



Fig.11 Further used engine oil abandoned in the fishermen's harbour (photo G. Lupinacci)

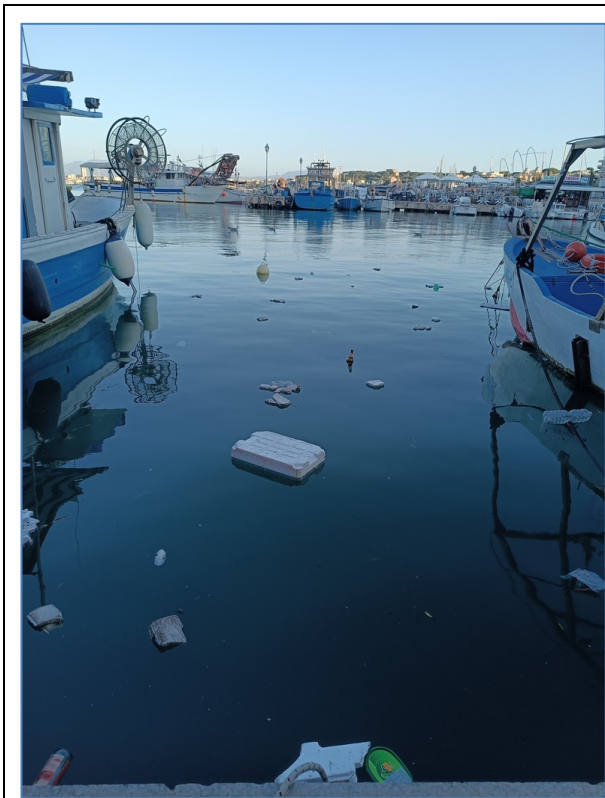




Fig. 12 Waste at the marina, the port of trawling and the port PiccolaPesca (photo F.Fornaro)

2.1 Working group meetings

SeaPaCS team invited interested citizens to join a working group operating on the issue of placing recycling bins at the fishing port of Anzio, aimed at identifying the stakeholders who are interested in the problem, and those who could contribute to solving it, and to sensitize the institutions towards the creation of the eco-center. The group (about 10 active participants among fishermen, layers, businessmen in the plastic sector and representatives of local institutions) met and discussed approximately once every 15-20 days at the Italian Naval League in Anzio (notably, on the 20/06/2023, 10/07/2023, 18/07/2023). The working group met the local City Council representative by invitation on the 31st of July 2023. The municipal authority was aware of the problem and, thanks to the citizens' involvement, engaged to address it. After another meeting on operational and political issues about the Eco-Centre held on 4th September 2023, a survey of the port together with SeaPaCS's coordinator and Anzio's fishermen was carried out on 14th September 2023.

On 26th October 2023, the whole port of Anzio was cleaned by the fishermen, and all the trash was properly disposed of, thanks to the initiative and support of SeaPaCS in cooperation with the Municipality of Anzio. Metallic grid define now the space assigned to every fishing boat for disposing large and hazardous waste that will be collected and destined to the appropriate treating plants.

In the forthcoming months it is expected that waste disposal bins will be positioned at the harbour.



Fig. 13 Cleaned harbour (photo E. Monaco)

In order to support the harbour management toward better sustainability, SeaPaCS project is also expected to provide fishermen with recyclable boxes for fish selling activity at the harbour (about 150 for 18 boats) provided by the Duwo start-up company. This can contribute to the elimination of disposable polystyrene boxes that represent one of the most pervasive sources of pollution of the harbour and coastal sea, especially when not correctly disposed of.



Fig. 14 Duwo flyer

Annex I . Personal data collection and management procedure

The personal data collected are about name and surname, professional status (only if relevant), email and/or telephone number. No sensitive data have been collected at any stage of the project.

Moreover, during interviews with the fishermen, SeaPaCS collects their experience and opinion concerning the problem of marine plastic pollution. Those data, however, do not qualify as sensitive data and no other personal data will be collected. In fact, no transcription have been made from those interviews: the recorded audio interview will be heard to extract topics and opinions about the plastic pollution and then immediately stored in the secure storage system of Raw-News. Nevertheless, should the interviewed considered her/his/their personal opinions as sensitive data, she/he/they has been granted the possibility not to answer the questions she/he/they feels uncomfortable with (see *Information Sheet*). Upon a formal agreement (*i. e.* signed consent form) with the person that has been interviewed, a video interview has been recorded by the RawNews who signed a contract about the management of personal and/or sensitive data with the University of Turin.

The personal and administrative data are only collected by the core members of the CS.

Administrative data included in the first mailing list will be only handled by authorised SeaPaCS core members (under the authorisation of the “UniTo Privacy and Ethics Office”) and are stored in a secured management platform whose access is only possible to authorised researchers.

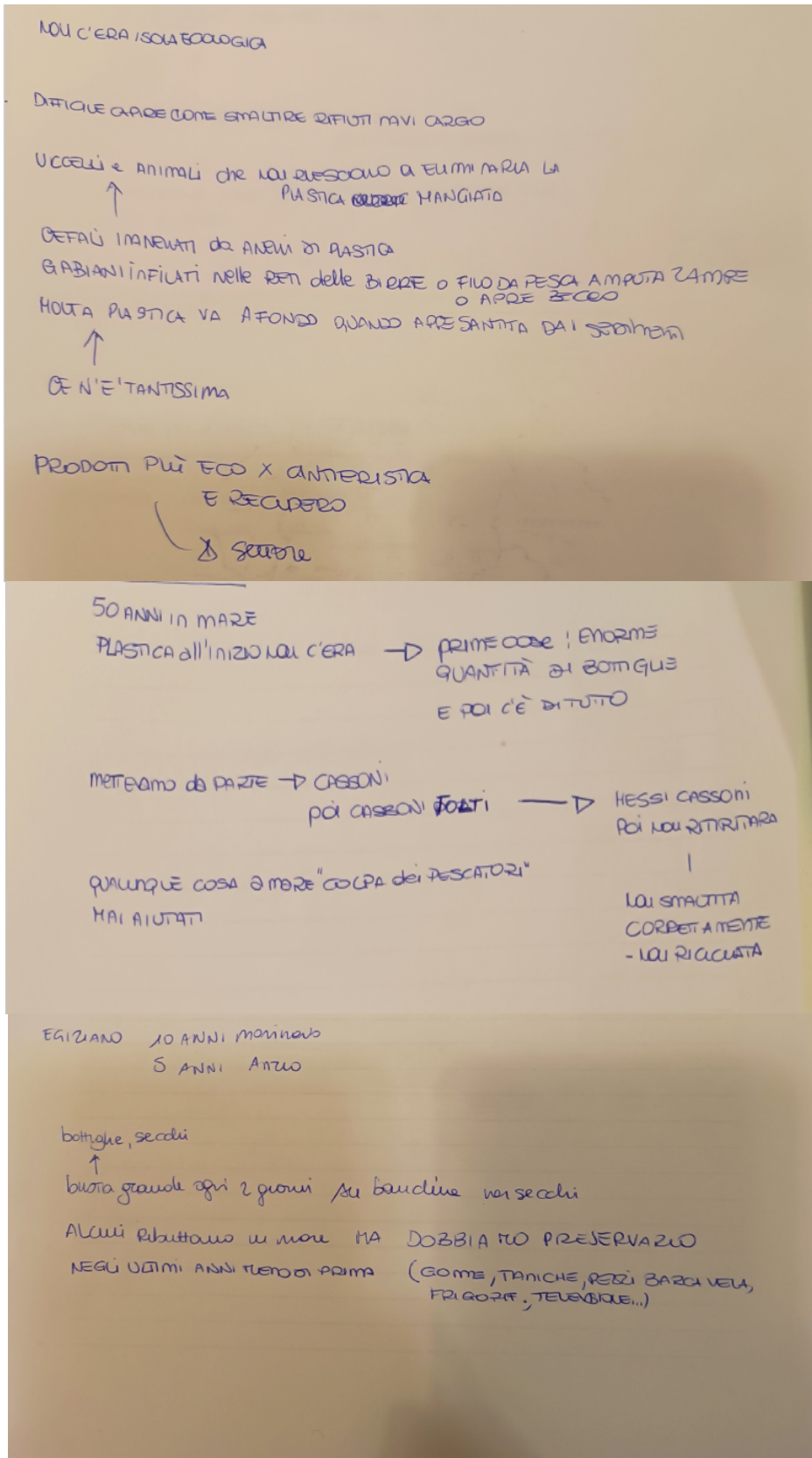
Prior to the interviews, fisherman’s names and roles have been asked and recorded for the purpose of identification of the respondents:

- names have been pseudonymised in the elaboration of the research outputs, unless interviewed people will give their explicit consent to their use. The anonymous datasets can be kept without a timespan. Pieces of information in these documents make it impossible to identify the participants and, therefore, cannot longer do them harm. These datasets must be kept for reuse;
- jobs or roles have been mentioned during the interview. This is a relevant information in the pursuit of describing socio-political framework for the emergence of ICT-based participatory approaches in urban governance; as a matter of fact, personal opinions about the investigated topic will represent an important element in the analysis exactly because of the position and competence of those who express them. Nevertheless, unless explicit consent will be granted for the use of personal names, only a generic reference to the role of interviewers will be included in the research outputs.

Core members of SeaPaCS. Names and roles of interviewed fishermen can be made public in the short video intended for the web only if they give explicit consent to this. The University of Turin is providing us with a dedicated consent form for video-recording.

The information and consent form is available online at <https://crowdusg.net/seapacs/>

Annex II. Individual interviews concept maps

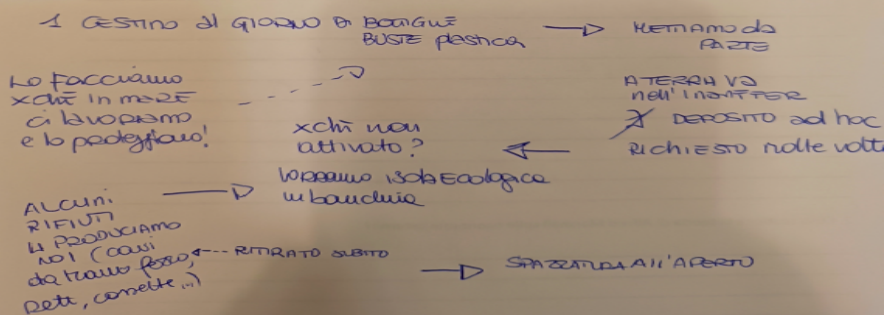


USCITE 12 - 24h

PESCE RIMA STO UGUALE -> RAZZOLE e COCCI ↓
↑ piccolo pesce

14 h -> 40 CASSE prima era meno

PRIMA 40anni -> acqua bevuta dal rubinetto -> meno plastica e a mare mai c'era. Solo dopo mareggiata c'erano pezzi di sacchi dai fiumi



Tempo attivo - mare grosso -> AZIENDA plastica

4 buste grandi al giorno quando tonda quando poco 1 ceste

40 anni fa si trovava plastica ma meno e nessuno ci badava

PIU' PLASTICA VIENE DA MERCANTILI, CROCIERE che TRITANO RIFIUTI e buttano mare

GRANDE PESCA porta 1 SACCO al GIORNO -> 10 SECCOIME e puzza

FATE MOLTE PRESSIONI x RIPULIRE e RIMUOVERE, DENUNCIATO e PARLATO del problema

PREFERISCONO NON USARE e NON PULI PORTABILI al PORTO TI DENUNCIANO

PODD. È DI TUTTI -> HARE LO RIDISTRIBUISCE con CORRETTI e PULITA

TIRATA CANOA, MOTORINO, BICI...

FINISCONO PICCOLI RESERTI DAPPERTUTTI

PERSONE IN SPIAGGIA USCIAO DI TUTTI

GESTIONE INADEGUATA! Chi gestisce e tiene?

Dopo poco è tutto pulito ma si sa xché

LUOGO PESANTE MAI PAGATO

LE porta del podd. ma non PAGA

PESCATORI POTRE BERO FARE SERVIZIO

-> Abbiamo fatto tanto ma mai pagato

Cambiamenti e moste → inquinamento ↑
TONNI e Delfini mangiamotutto : NESSUN ALBA

2006 INIZIATO A RACCOGLIERE
Plastica, FOI DI FUSO
NE PRENDIAMO TANTA

MA DA QUANDO FACCIAMO QUESTO
CE NE TENO : XD LA
LEVIAMO?

PROBL.
A TERRA :

PLASTICA COMINCIA AD ARRIVARE
MA È MENO

SECCHIO
INDIFFERENZATO

e noi dovremmo prenderci il costo

→ FACCIAMO UN
DISCORSO AD
ARRETRATO X
IL MARE

peratori 1

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zati

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da 3m fino a 15m
di profondità

inverso
tanto

estete
meno

da 2cm
in m

con denti
di cane, tranchie
dichiani, piatti,
buste...

mare morto → tanta plastica

s'incanta sulle
zati a
tramaio

2 bidoni:
carta e
plastica

PROBLEM 1

a 10-15
anni fa
ce n'era
di più

si pesca
molto di
meno

plastica
dentro al
pesce

30% in
meno di
pescato

aumento della
raccolta di spazzatura
a terra

specialmente
con il mare
caldo

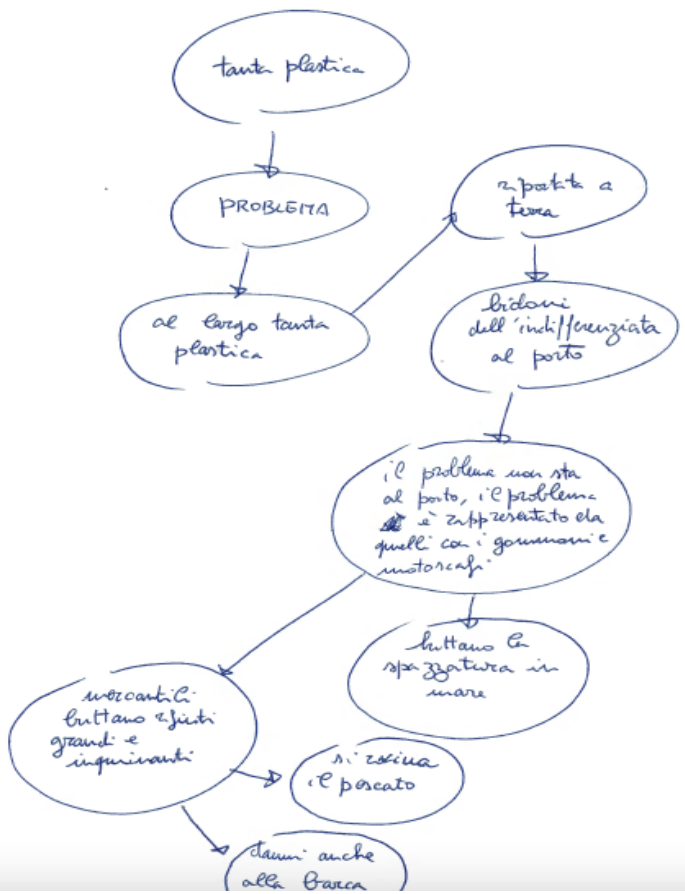
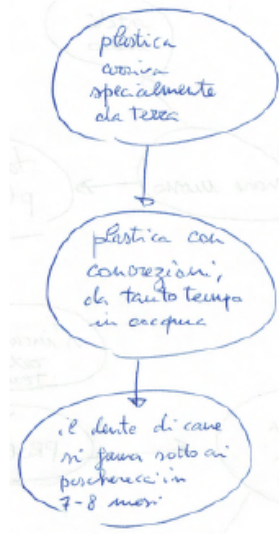
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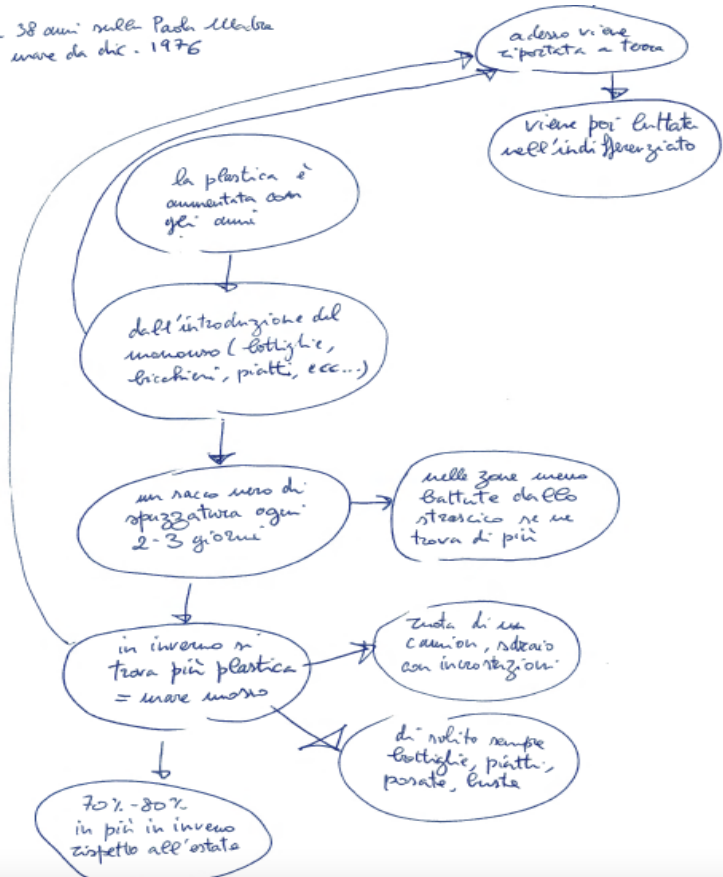
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cete a stacco
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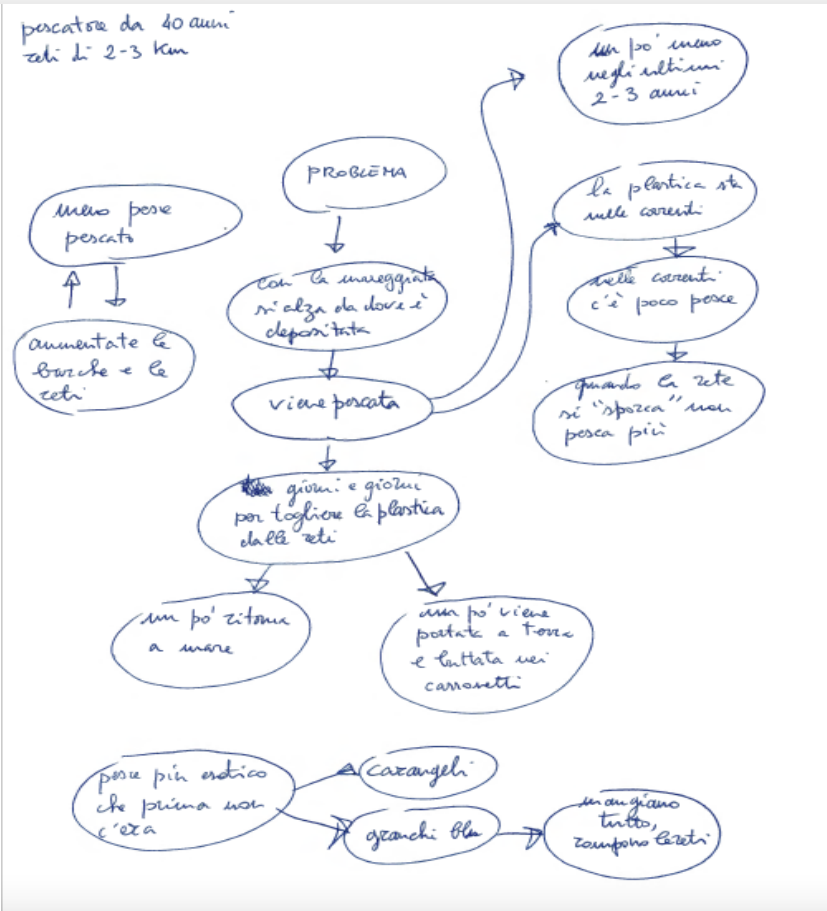
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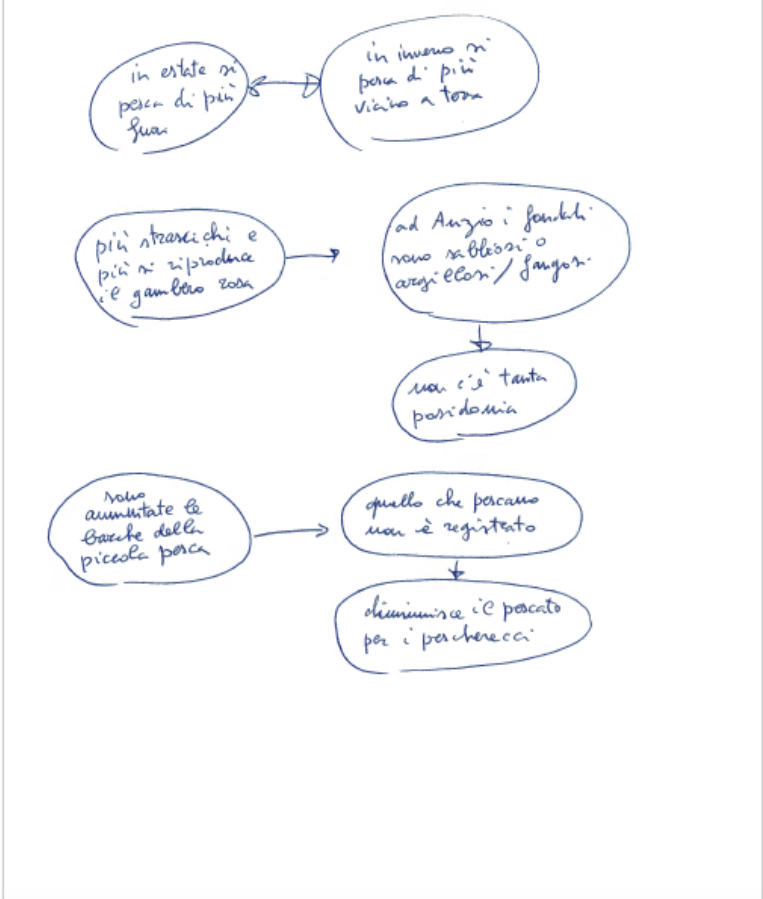


da 38 anni nella Padi Umbra
in mare da dic. 1976



pescatore da 40 anni
reti di 2-3 km





2

molta più plastica
quando c'è il
greca &

correnti portano la
plastica

la plastica
entra nella
catena
alimentare

manca di controlli

spazzatura gettata

manca di
educazione

malcostume

manca di
manutenzione