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**TACKLING SINGLE-USE-PLASTIC PRODUCTS
IN THE EASTER MEDITERRANEAN SEA: THE
BL.EU CLIMATE AND MEDFREESUP
PROJECTS**

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Chapter 9

Tackling single-use-plastic products in the Easter Mediterranean Sea: The BL.EU Climate and MedFreeSup projects

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Abstract

The Mediterranean Sea is a top tourism destination in the world hosting more than 320 million tourists a year but it's also one of the most affected areas by marine litter worldwide, polluting its shores and pristine coastal waters. Marine litter is estimated to cause an annual economic loss of €61.7 million to the EU fishing fleet because of reduced catch and damage to vessels, while polluted beaches can discourage tourists with consequent job losses in the sector. In this chapter⁶, two projects funded by EIT Climate-KIC (2020) are being presented. The BL.EU. Climate project addressed the challenge of plastic marine littering in southern European waters by building capacity in three Mediterranean countries: Greece, Portugal and Croatia. The project is identifying the plastic marine littering issue at the very beginning of its life cycle, and on the prevention side that can lead to plastic waste reduction and in consequence reducing carbon emissions from both production and waste management stages. The MEDfreeSUP project aims to set replicable voluntary protocols for free single-use plastics food packaging adoption for cafes, restaurants, foods stores, hotel, beach facilities, but also public events and public places in three Mediterranean countries: Greece, Italy and Croatia. The project, which is ongoing, provides support and guidance to local business to comply with the EU SUP Directive and to engage Mediterranean islands and cities in the transition toward a free single-use plastic environment. This chapter presents the key findings and challenges of these projects dealing the impact of single use plastics in Greece, which is one of the projects' countries.

Key words: plastic pollution, marine litter, single use plastics, Climate-KIC

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9.1 The challenge of marine litter in the Mediterranean Sea

Plastics are synthetic or semi-synthetic compounds made from carbon-based materials with specific properties, which are widely used because of their durability. Due to this, plastics are used widely also in the packaging of food products. Management of plastic waste is crucial, as most plastics are not biodegradable and remain in the natural ecosystems for hundreds of years. Today, only one third of the 27 million tonnes of plastic waste generated each year in Europe, is actually recycled (WWF, 2018).

The Mediterranean Sea⁷ is a top tourism destination in the world hosting nearly 314 million international tourists a year, with European Mediterranean countries attracting most of the tourists, but it is also one of the most affected areas by marine litter worldwide, polluting its shores and pristine coastal waters (UNWTO, 2014; UNEP MAP, 2020). According to a WWF Report (2018), the Mediterranean Sea is today one of the seas with the highest levels of plastic pollution in the world, accounting for 95% of the waste in the open sea, on the seabed and on beaches across the Mediterranean. This waste comes mainly from the land and marine-related activities like fisheries, tourism, and maritime transport. Marine litter consists of a wide range of materials, which vary regionally.

Growing at four per cent per year, plastic goods production in the Mediterranean reached almost 38 million tonnes in 2016. This represents 10% of all plastic goods produced globally, making the region the world's 4th largest plastic producer. The emissions by plastic production across all Mediterranean countries reaches approximately 194 million tonnes of carbon dioxide each year, accounting to approximately six times the annual carbon emissions of London (WWF, 2019).

The generation of plastic litter in seas and oceans exhibits several environmental impacts. EFSA (2016) points out the presence of microplastics and nanoplastics in the food-chain, with particular focus on seafood, raising concerns on the increased toxicity on the food products harvested at sea due to contaminants. Besides the direct impact in the quality of marine environment, marine littering has a significant socioeconomic impact. Marine littering threatens public health through the food chain which in turn reduces the catch of the local fishers and in turn contributes to loss of jobs (i.e. fishermen, tourism etc.), property devaluation, and population move.

The economic impact of marine litter is thought to be significant, especially when taking into consideration the above-mentioned health costs. Key economic sectors in the Mediterranean, especially fisheries and tourism are negatively impacted by plastic pollution. Marine litter is estimated to cause an annual economic loss of €61.7 million to the EU fishing fleet (around 0.9% of annual total revenues) because of reduced catch and damage to vessels, while polluted beaches decrease tourist demand and consequently job losses in the touristic sector (UNEP, 2016).

⁷ The countries surrounding the Mediterranean in clockwise order are Spain, France, Monaco, Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Turkey, Syria, Lebanon, Israel, Egypt, Libya, Tunisia, Algeria, and Morocco; Malta and Cyprus are island countries in the sea.



Figure 9.1 – Overview of the plastic lifecycle in the Mediterranean (million tonnes) (source: WWF (2019))

WWF (2019) Report supports that the main system failures resulting in plastic pollution across the entire plastic life cycle can be broken down in five stages: production; consumption; waste collection; waste treatment; and secondary markets for recycled material (Figure 9.1). The lack of incentives for upstream innovation, tourism, lack of collection and recycling capacity and the low profitability complete the picture of main sources of pollution. Nonetheless, according to Plastics Europe (2015), the major source of waste is considered to be plastic packaging.

In Europe, plastic production comes in three broad categories: about 40 % for single-use disposable applications, such as food packaging, agricultural films and disposable consumer items; 20 % for long-lasting infrastructure such as pipes, cable coatings and structural materials; and 40% for durable consumer applications with an intermediate lifespan, such as electronic goods, furniture, and vehicles. In advanced economies, plastic bags are among the most-found plastic packaging litter items (EEA, 2015).

Currently, technological innovation in areas such relevant to material design, separation technologies, chemical recycling, reprocessing technology and renewably sourced and biodegradable plastics is unlocking new opportunities. A growing number of governments are in the process of designing and implementing policies related to reducing the environmental impact of plastic packaging, while the demand for single use plastics is deteriorating in some of these cases already (WEF, 2016).

In Greece, the total amount of plastic waste generated in 2016 was 257 thousand tons, decreased by 65% compared to 2006 (755 thousand tons) according to Eurostat. Almost 39 thousand tons of plastic waste were recycled, while only one thousand ton was landfilled. Greece appears in the second lowest position, after Cyprus, in terms of per capita volume of processed and recycled plastic waste (4 kg per person), according to Eurostat data. However, the relevant published data by the Hellenic Recycling Agency differ significantly, signifying underestimations from the side of Eurostat and the need for further and deeper research.

In addition, according to the recyclable raw materials trade data of Eurostat, about 61 thousand tonnes of recyclable plastics were exported to other countries (inside and outside the EU) (IOBE, 2019).

The wider plastic industry is an important driver of growth for the Greek economy. The total contribution of the sector from its operation is estimated at €3 billion or 1.6% of the country's GDP in 2018. In terms of employment, total contribution is estimated at 67.2 thousand jobs (direct, indirect and induced impact), or 1.8% of total employment in the country, while public revenues from taxes and contributions due to the operation of the sector exceed €900 million (IOBE, 2019).

The above environmental and socioeconomic characteristics depict the need for a transition to a new era where single use plastics are eliminated, recycling rates of plastics is increased. In addition, elements that give added value and increase competitiveness of the industry globally are necessary. The transition of the Greek plastics industry should modernise the production process and proceed with adopting circular models in their production. This will not only strengthen their presence in the market but will also help the skills upgrade of the existing employment. In other words, the reform of the sector shouldn't only consider the environmental, but the social and economic aspects as well.

9.2 Policy mapping on plastic reduction and circular economy

WEF (2016) reports that *“The circular economy is gaining growing attention as a potential way for our society to increase prosperity, while reducing demands on finite raw materials and minimizing negative externalities. Such a transition requires a systemic approach, which entails moving beyond incremental improvements to the existing model as well as developing new collaboration mechanisms”*.

In January 2018, the European Commission launched the “EU Plastic Strategy” (European Commission, 2020) to reduce single-use plastic pollution followed by the EU Directive on the ‘Reduction of the Impact of Certain Plastic Products on the Environment’ (SUPD), published in June 2019 and entered into force in July 2019 to tackle the plastic waste issues in the European countries and reduce marine plastic litter. The SUPD requires Member States (MS) to prohibit certain SUPs items (cutlery, plates) use and requires MS to take the necessary measures to achieve an ambitious and sustained reduction in the consumption of several other SUPs products. It is worth noticing that the SUPD covers single-use plastic items including bio-based and biodegradable plastics regardless of whether they are derived from biomass or are intended to biodegrade over time as well as those made of different materials (multi-layered or composite materials), such as plastic-coated paper or plastic-lined cartons.

As explicitly stated in article 2, coherently with the “waste hierarchy” within the Directive 852/2018 and the EU circular economy approach (EU action plan for the Circular Economy - EU COM/2015/0614 - and European Strategy for Plastics in a Circular Economy - EU COM/2018/028\), the SUPD promotes circular approaches that give priority to sustainable and non-toxic reusable products and reuse systems rather than to single-use products, aiming first and foremost to reduce the quantity of waste generated. The restrictions for food packaging and beverage cups introduced by the SUPD offer the opportunity to scale-up reusable alternatives rather than simply switching to other single-use based material. However, this requires a systemic and widespread behavioural change to move away from single-use plastics, towards reusable products and systems. Despite several solutions being developed and applied locally to prevent SUPs products across European regions and cities, there is still a lack of policy support for the wide spread of these alternative through incentives for innovation adoption of non-SUPs products to enhance systemic change and enable a drastic reduction of plastic consumption thus reduction of plastic production and CO2 emissions.

For a long-term, environmental policy in Greece mainly focused on waste management (e.g. reduction and re-usage), where CE projects were fragmented, often considered identical to material recycling. Following the EU legislation and the Communication of the Action Plan for the circular economy the Hellenic Ministry of Environment and Energy adopted a National Circular Economy Strategy (NCES) in 2018 capturing a refined methodology of implementation CE in Greece (Ministry of Energy and Environment, 2018). Although significantly delayed, the NCES is an excellent list of topics to be discussed as basic themes for a future implementation plan. One of its main drawbacks is the fact that it neglects to address core challenges of the country. Specifically, lagging regions, suffering from persistently low private investments and limited bank liquidity tend to adopt short-term, survival solutions. Thus, a prerequisite for the NCES to succeed is a detailed context-specific analysis of cooperation, coordination and synergies to come up with solutions shifting from a short-termism behaviour to a realistic, profitable, long-term strategy and the corresponding action plan (Koundouri et al., 2019).

9.3 BL.EU Climate - Climate Innovation in Southern Waters

The main objective of the EIT Climate-KIC BL.EU Climate project, that was implemented in 2019, was to address the challenge of plastic marine littering in southern European waters by building capacity for innovation to address the issue at the very beginning of its life cycle, on the prevention side and plastic waste reduction with significant climate change mitigation potential from the reduction in the collected and handled plastic waste. Greece, Portugal and Croatia gathered around this problem and identified three pillars around ports (commerce, fishing, tourism) working closely with local problem owners: in Croatia, islands Cres Zlarin; in Greece, the port of Piraeus, islands of Milos and Andros and in Portugal, the port of Lisbon (BL.EU. Climate, 2020).

The project started by conducting an extensive stakeholder mapping in all areas. Secondly, validation interviews/survey were performed based on a common questionnaire designed by all project beneficiaries, which was targeting tourists of the above-mentioned regions. The results of the questionnaires were analysed and presented at different workshops conducted in the project sites. The main objective of the workshops was to trigger discussions among the participants (mostly stakeholders identified at the mapping exercise) on potential solutions to prevent, reduce and collect marine litter, focusing mostly on plastics. All the above led to the design of a strategic roadmap by all three countries, identifying steps to reduce the negative effects caused by plastic waste in the future, supporting not only Governments, but also regions, municipalities, industries, consumers and civil society to improve the awareness campaigns, systems design, replacement, refuse, recycling and reuse of plastic.

The outcomes of the BL.EU. Climate project for the Greek case studies (Piraeus, Milos and Andros islands) are presented in the next section, below.

9.3.1 Stakeholders mapping and problem identification

The project team chose four tools from the EIT Visual toolbox for system innovation, problem definition and stakeholder mapping in all project countries (De Vicente Lopez, J. & Matti, C., 2016). Below, the stakeholder mapping for the Greek case and the corresponding methodology is presented.

Nailing down the problem and identifying its different components and details has been the first objective of the research team, which aimed at arriving at a common ground for future actions towards

the reduction of marine litter in the seas of South Europe. The use of the Pentagonal problem tool (Annex 1) identified the key dimensions related to this problem and facilitated the understanding of that complex and multi-dimensional challenge, which extends to climate change, societal, economic, resource and technical challenges. The common climate change challenge is linking the generation of marine litter with emissions from the collection and from sound waste management. Regarding the social and economic challenges for all locations reducing littering especially during touristic seasons and managing the negative economic impact on tourism and fisheries emerge as priorities for all case studies, with non-existing recycling infrastructure on the islands of Milos and Andros being an additional challenge to overcome. Funding is another key aspect in terms of resources that drives the response velocity of the Greek islands in confronting the marine litter problem.

A significant number of stakeholders are involved in the plastic litter issue. To list and categorise the myriad of stakeholders around the project the Actor tree canvas tool (Annex 2 - Actor Tree tool was used. The common ground and the common challenge to develop a Roadmap for Plastic Free southern European waters led to the identification of 14 common stakeholder groups, from fishermen, tourists, citizens and start-ups related to maritime, to policy makers, NGOs, Researchers, Universities and Schools, Foundations, shipping companies, plastic and recycling industries. Specifically, a key stakeholder in the island of Milos, seems to be a raw material extracting company.

The building of a stakeholder profile was allowed by the Enlarged empathy map tool (Annex 3) by quickly browsing the sources of information available to any individual. Its great value lies in the delivery of a clear and accurate profile of the stakeholders. Mostly affected by the plastic pollution of the seas are the fishermen, while the biggest polluters seem to be the tourists and big companies, which benefit other key stakeholders (e.g. local Maritime Industry, SMEs). Finally, policy makers seem to play a key role in preventing or perpetuating the issue.

Lastly, in order to identify the interdependencies among the core players in the plastic industry, the Interest-Influence-Adaptation map tool (Annex 4) was used, which demonstrated where stakeholders stand when evaluated against the same key criteria and compared to each other. In all Greek case studies, policy makers are ranked medium to in all three key criteria (e.g. interest, influence and adaptation), being an undeniable key stakeholder in this challenge. Besides the high interest and adaptability to change of fishermen, they have limited influence on the issue, being, thus, dependent on more influential stakeholders, such as the municipality, or in the case of Andros the tourists.

The engagement strategy of the primary stakeholder identification analysis presented above will aim at the engagement of the stakeholders at different levels using a number of fora in order to integrate their input within the project. The three key stakeholder types, as identified in the analysis above, were interviewed in order to validate the presented outcomes, while tourists were interviewed in regards with their awareness and willingness to pay for the transition into higher quality and more sustainable ecosystems. Lastly, a participatory workshop, which took place at the end of the project, aimed at bringing together core actors related to the plastic pollution in these areas in order to exchange views on the potential solutions.

9.3.2 Survey and conclusions

The analysis of the questionnaire responses from the three locations in Greece (Piraeus, Milos, Andros) highlighted findings that are relevant to the wider range of stakeholders related to marine litter, such as

policy makers at national and regional levels, entrepreneurs of the tourist sector, tourists and researchers.

As a first finding, most of the respondents understand that the natural environment is at crisis and this is caused mainly by anthropogenic factors. Human intervention is perceived to have had bad consequences at the environmental ecosystems, while, most of the participants in the survey mentioned that humans do not have the right to modify the natural environment based on their own needs, which after all, is one of the basic notions of environmental sustainability.

In contrast to the above, the survey revealed that even though a level of environmental awareness exists, in some cases this is considered to be superficial. Around one fourth of the participants do not understand core environmental problems and therefore cannot be engaged in further actions, either during their vacations (i.e. stop using single use plastics at the beach) or in their home country. On top of that, most of the respondents mentioned that they are not aware of the Plastics Directive (European Parliament, 2019). This finding indicates a gap in engaging in education and information of the public, while it is consistent with findings from the AdaptInGR project (LIFE-IP AdaptInGR, 2019), which identified that 22% of Greek respondents were “a little” or “not at all” informed about climate change.

It was also evident that the participants could not identify the importance of sustainability and its potential links to environmental and economic systems. A striking example is that a significant number of people were not aware of the extent of the marine plastic pollution and its detrimental effects on the marine ecosystems.

That gap was evident across almost all questions asked. For example, many of the participants did not consider the natural environment as part of their own living niche. In fact, the analysis showed that they were willing to pay (WTP) more for a clean hotel room but less for a cleaner/greener ecosystem. It is obvious that despite acknowledging the importance of sound environmental management, these respondents could not understand how environmental degradation could affect them and therefore considered it as a problem related to the wider society. Most of them were not willing to pay more than €5 to receive green environmental services during their vacations.

In addition to the above, even though a significant part of the sample identified the importance of preserving the natural environment and have already stopped (or are willing to stop) using plastic bags, plastic straws and other single use plastics (Figure 9.2), few were aware of key European policies on plastics (such as the Plastics Directive). In more structural characteristics, higher levels of awareness were denoted among younger people, whereas people belonging to older age classes appear to be more reluctant in understanding core elements of sustainability and designing adaptation measures. Higher income families of the sample have not yet developed the need to purchase greener vacations, a finding which is significantly different to the tourist sectors of other EU Member States (Italy, Sweden, Norway etc.).

Even though a great share of the responses identified the significance of environmental responsibility, it was observed that the WTP was low. Additionally, when the cost factor was removed from their decision, the respondents were willing to adapt their needs. When the participants in the study were asked to rate different behavioral change strategies, they showed preference to methods that do not involve additional efforts or costs.

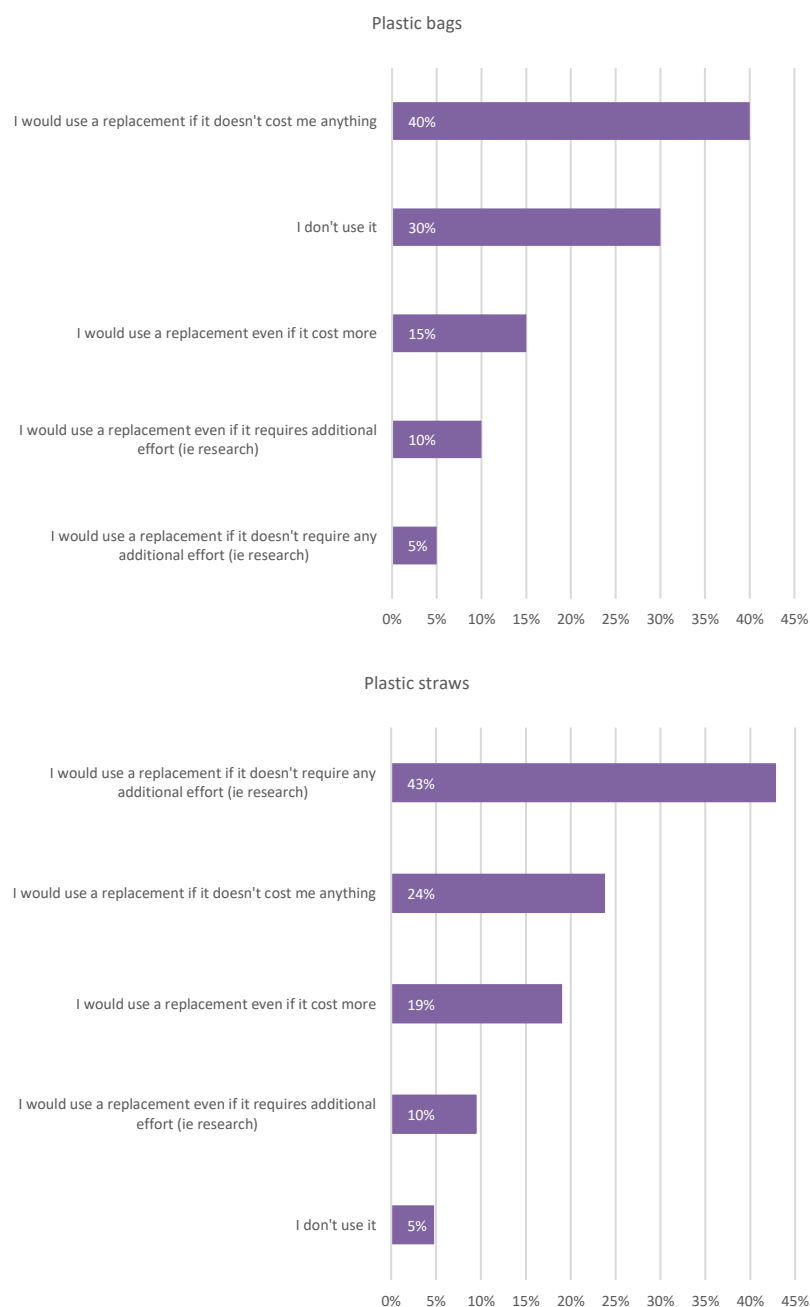


Figure 9.2 – Perceptions on the replacement of single use plastics

9.3.3 Design of the Roadmap

The Roadmap is a strategic tool co-created by all partners in the three countries aiming at providing insight for all involved parties on needed measures to reduce plastic waste in the Mediterranean Sea. The 10-year roadmap developed for the BL.EU Climate project identifies the actions that need to be taken by policy makers, the private sector and the society in the future in different time spots (2020, 2025, 2028, 2030, 2030 and beyond) so that the environmental footprint of single use plastics is reduced drastically. This can happen by avoiding unnecessary packaging and banning non-recyclable plastic. These actions, if properly designed, can lead to modern business models that stimulate growth and jobs.

By complying with the EU regulations, the Member States can support the shift of regulating the plastics industries to more environmental processes in the production line, to the production of higher added value materials (e.g. bioplastics, recyclable plastics) and to apply environmental standards in the R&D stage, i.e. in the design of the product.

Also, Member states could promote environmental and sustainable strategies according to EU regulations, by funding research projects in partnership with private companies (e.g. European structural and investment funds by European Commission), to identify the best available techniques for alternative materials to replace single-use plastics and support innovation, by providing necessary infrastructure (i.e. public fountains for safe drinking water) and by driving public debate and supporting youth delegations such as “Zero Plastic” ambassadors for international events.

Once again education is key to understand the environmental impact of plastic littering and how it affects public health. The educational system needs to be rethought/redesigned at the government level, leading schools and universities to avoid plastic, promoting discussion and change. Equally, education of policymakers and decision-makers is considered important. In a regional and European level, it's important to consider ourselves as an inseparable part of the natural ecosystem, taking up responsibility, embracing climate-friendly actions in order to prevent harmful effects to our seas and oceans. The Paris agreement should be seen as a navigator to investment and financing opportunities around climate change, strengthening the role of the private sector in taking climate action.

The private sector should invest on new business models that integrate not only the economic, but the social and environmental standards required by the society and the Government. Models such as circular economy (CE), sharing economy and blue economy are already becoming reality but there is a need to expand and apply those models on traditional sectors such as food industry. The private sector could be a pioneer and increase competition by providing guidelines for tourists, encouraging good environmental standards, such as zero waste and recycling practices. Private companies could also be involved in deposit-return schemes, acting against the throw-away culture and ban the multi-layered packaging that cannot be recycled. Also, the private sector needs to play a key role in developing packaging design, materials and technologies in line with the circular economy, that provide sustainable solutions to valorise used plastics and thus reduce plastic waste (Ellen MacArthur Foundation, 2017).

The civil society composed of non-governmental organizations and youth-led movements can create awareness campaigns that target different audiences at different levels. Civil society organizations can lead plastic-free events in different scales, at neighborhood level, or plastic-free campus on Universities, creating partnerships with private sector pursuing to pressure the governments to provide funding and support investments towards plastic waste elimination. It is important to create communication for high-level politicians and industry as well. Non-governmental or civil sector organizations should lead and help establish a platform for sharing information and supporting change-makers. It is necessary to engage communities in order to increase citizen-science and promote recycling methods and informational campaigns (various targeted groups, from schools to popular tourism destinations).

9.4 MEDfreeSUP project: tackling single-use-plastic item uses in the Easter Mediterranean Sea

The EIT Climate-KIC MEDfreeSUP project, kicking-off in 2020 for a 2 years period, falls in the plastic waste prevention (PWP) approach developed by EIT Climate-KIC eCircular programme, to enable local ecosystems to move towards reusables materials. This is foreseen as one of the most efficient solutions for addressing the single-use plastics packaging problem, providing tangible economic, environmental

and social benefits. The project will focus on the East Mediterranean coast, targeting the three biggest coastal countries: Italy, Croatia and Greece, with pilots sites in the Italian region of Emilia-Romagna (Bologna, Cervia, Misano Adriatico, Ravenna), Aegean Sea (Greek islands of Syros and Ikaria), and Ionian Sea (Greek island of Corfu and Croatian islands of Zlarin and Cres)

The main objective of the project is to set a replicable voluntary protocol for free single-use plastics items related to food packaging in cafes, restaurants, food stores, hotel, beach facilities, as well as for public events and public spaces. The purpose of the protocol, to be design as a toolbox, is to provide support and guidance to local businesses in order to comply to the newly EU SUP Directive⁸ (2019), and go beyond the law to engage Mediterranean islands and cities in the transition toward a free single use plastic environment. The project will follow a system innovation approach, benefiting from EIT Climate-KIC extensive network of innovative start-ups and research facilities which can support the transition towards Single-Use-Plastic (SUP) free environment. The involvement of problem's owners (local stakeholders with the need of eliminating single-use-plastic items) will play a central role in the project, being at the core of the strategy to develop the protocol. The project will create a learning loop between the scientific community, the industry, policy makers and local businesses in order to identify effective alternative solutions to the use of SUP items, thus limiting the consumption of plastic products which will in turns decrease the production of plastic item itself and plastic wastes. Therefor the project ought to have positive impacts both at the start and at the end of the plastic chain, reducing CO2 emissions and marine plastic litters.

The project will build-up on pre-existing projects focusing on marine plastic litter and waste management (i.e. Interred Mediterranean ACT4LITTER and Plastic Busters projects) and work closely with local stakeholders and business owners to assess their needs and co-identify alternative solutions and new innovative approaches to replace SUP items. The inventory of potential solutions for free SUP item in bars, cafes or restaurants will include a legislative, environmental and financial assessment in each country to ensure that the proposed alternatives are legally applicable, environmentally and financially sustainable to avoid creating new negative environmental externalities and financial burdens. Additionally, through the protocol, MEDfreeSUP seeks to assess the capacity of public authorities (from local to national and EU level) to support local businesses in the transition to the use of non-SUP items and ensure the smooth implementation of the EU SUP Directive. In the current Covid19 context, the financial capacity of local business owners in coastal touristic areas (main targets in Greece and Croatia pilot sites) to support the potential additional costs and changes in the ways the business should operate when it comes to using alternatives products to plastic items, is even more relevant if we wish local stakeholders to voluntary accept the switch to a new environmentally friendly business model without SUP items.

To sum up, the protocol will provide a guideline for local business to eliminate SUP items by presenting the alternatives available at country level and proposing supporting tools for the implementation of these alternatives, in cooperation with relevant public authorities and business service providers. The MEDfreeSUP project will additionally tackle behavioural's change in consumers (tourists and local residents) by setting an online awareness platform following a gamification approach. It will engage consumers in being pro-active in their choice of consumption with a rewarding skim to stimulate the consumers' behavioural change and adoption of these solutions. The protocol and online platform will

⁸ Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment

be implemented and tested in voluntary pilot cities and islands to prove their effectiveness, viability, and ensure their replicability in other European regions.

9.5 Conclusions

The present chapter refers to the issue of plastic marine litter in the wider Mediterranean region and especially in Greece. Plastics account for 95% of the waste in the open sea, on the seabed and beaches across the Mediterranean, placing a burden on the environmental, social and economic sustainability of the area. In January 2018, the European Commission launched the “EU Plastic Strategy” to reduce single-use plastic pollution followed by the EU Directive on the ‘Reduction of the Impact of Certain Plastic Products on the Environment’. In Greece, waste management remains one of the most pertinent environmental problems. More than 80% of the generated waste are landfilled, while recycling accounts to 20%. Inconsistencies were noted in the data regarding plastic waste generation and management between official authorities depicting the importance of further research into this.

To mitigate the impacts of plastic litters in the Mediterranean, EIT Climate-KIC funded two projects, BL.EU. Climate (implementation period: 2019) and MEDfreeSUP (implementation period: 2020-2021), on creating knowledge and supporting the plastic reduction in the Mediterranean seas. The BL.EU. Climate project addressed the challenge of plastic marine littering in southern European waters by building capacity in three Mediterranean countries: Greece, Portugal and Croatia. The MEDfreeSUP project, which is the continuation of the BL.EU. Climate project, aims to set a replicable voluntary protocol for free single-use plastics food packaging adoption for the private commercial sector and for public places in three Mediterranean Countries: Greece, Italy and Croatia to provide support and guidance to local business in complying with EU Directives

According to BL.EU. Climate results, one of the greatest barriers in Greece is the knowledge gap across stakeholders. Most of the respondents understand that the natural environment is at crisis and this is caused mainly by anthropogenic factors. However, the most affected by marine litter actors (e.g. fishermen and tourists) seem to lack a basic understanding of the marine plastic pollution and its detrimental effects on the marine ecosystems, as well as the existence of European Directives on plastics. Fishermen specifically, seem to know about the marine litter problem, but they ignore the impacts on their professional and personal life, especially about the microplastics and how they end up in the food chain. Another contradictory outcome of the study was that besides the environmental responsibility was perceived as significant by the majority of tourists, their WTP for environmentally friendly services were comparatively lower to their WTP for a renting better facility. However, when the cost factor was removed from the decision-making choice, the respondents were willing to adapt their needs. Lastly, elderly people are observed to be less supportive of the environmental cause, despite identifying the importance of having good environmental status.

Finally, the project produced a 10-year roadmap identifying the actions that are needed to be taken by policymakers, the private sector and the society in the future in different time spots to tackle the plastics issue. Top priorities appear to be education and private initiatives in combination with regulation and policy implementation (e.g. Circular Economy Strategy). Education is key to comprehend the damages of plastic and how it affects public health, while the awareness raise could bridge the knowledge gap of adults, who have completed their secondary education. The private sector can be a pioneer in driving change by implementing circular economy models and creating opportunities supported by complementary laws and strategies.

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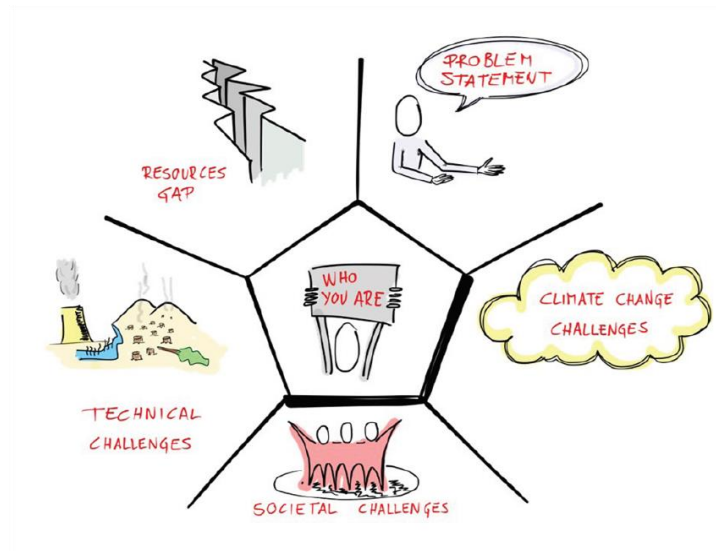
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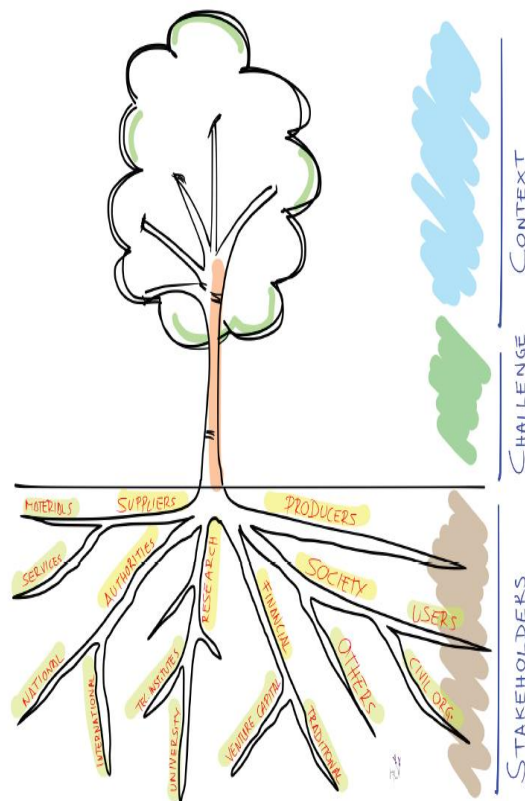
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Annex 1 – Pentagonal Problem Tool



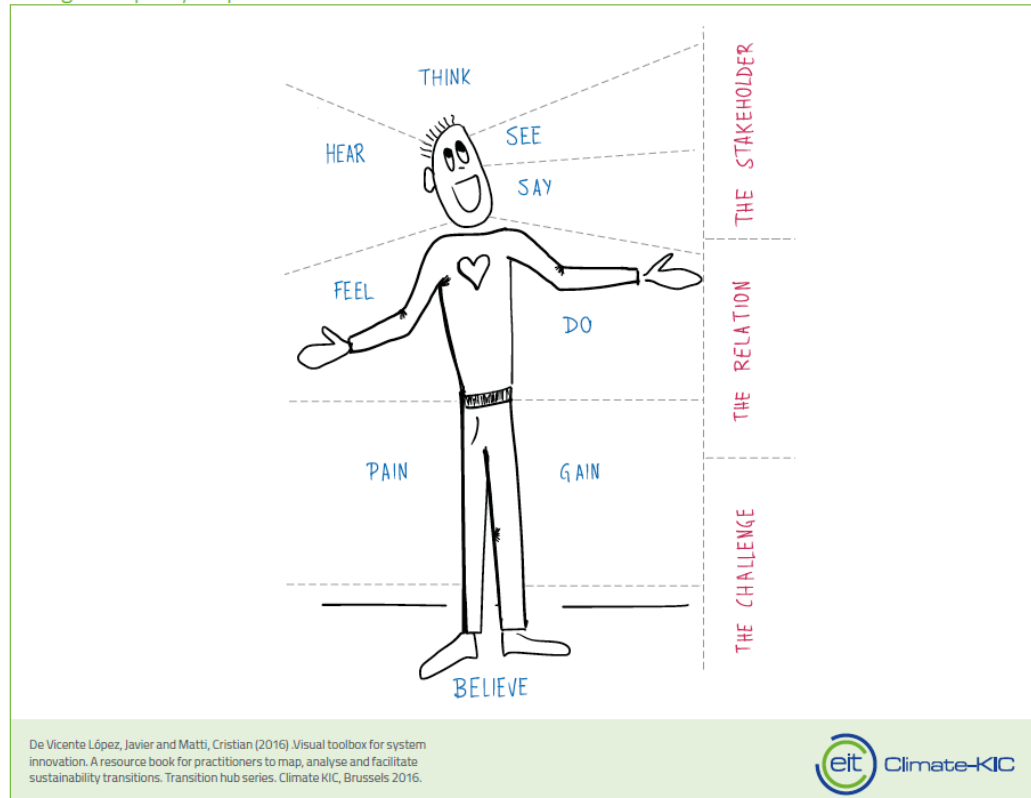
Annex 2 - Actor Tree tool



Annex 3 - Enlarged empathy map

Enlarged empathy map

The Canvas



Annex 4 - Interest, influence and adaptation map

