Regulatory Approach to Ocean Plastics

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The research investigates the problems and maps the solutions to the serious threat that plastics pose to the oceans, food safety, and human health, with more than eight million tons of plastic debris dumped in the sea every year. The aim of this study is to explore how to better improve the regulatory process of ocean plastics by integrating scientific results, regulatory strategies and action plans so as to limit the impact of plastics at sea. Adopting a problem-solving approach and identifying four areas of intervention enable the establishment of a regulatory framework from a multi-actor, multi-issue, and multi-level perspective. The research methodology consists of a two-pronged approach: 1. An analysis of the state-of-the-art definition of plastics, micro-, and nanoplastics (respectively, MPs and NPs), and 2. The identification and discussion of loopholes in the current regulation, suggesting key actions to be taken at a global, regional and national level. In particular, the study proposes a systemic integration of scientific and regulatory advancements towards the construction of an interconnected multi-tiered (MT) plastic governance framework. The milestones reached by the project SECURE at UiT - The Arctic University of Norway provide evidence of the strength of the theory of integration and rights-based approaches. The suggested model holds substantial significance for the fields of environmental protection, food security, food safety, and human health. This proposed MT plastic governance framework allows for the holistic and effective organization of complex information and scenarios concerning plastics regulation. Containing a clear definition of plastics, grounded on the precautionary principle, the MT plastic framework should provide detailed mitigation measures, with a clear indication of rights and duties, and in coordination with an effective reparatory justice system.

Plasticene seas science regulation sustainability multi-tiered system food health

1. Introduction

This study takes place within the broad context of the ‘Plastics Age’, also known as the ‘Plasticene’, characterized by an exponential increase of plastic deposits on the planet since the mid-1940s [1][2]. Scientists have been investigating the effects of the escalation of plastic pollution on the planet [2][3][4], and the impacts of plastic on the marine environment. Currently, there is at least eight million tons of plastic dumped in the ocean every year (IUCN 2021 [5]). There is consensus among the preeminent studies on the topic for the need for further research to explore the development of an effective and coordinated regulatory strategy to efficiently reduce plastic pollution on seas and lands [6][7][8][9][10][11].

A prerequisite and *condicio sine qua non* of the regulation process, in the absence of scientific certainty of harmful impacts of plastics at sea, is the reference to the precautionary principle and the need to take preventive urgent action. The precautionary principle is enshrined in Article 15 of the Rio Declaration on Environment and Development [12] and Article 191(2) of the Treaty on the Functioning of the EU [13]. The need for urgent action is especially evident in the case of the unknown impacts of the smallest particles of plastics: microplastics (MPs, less than 5 mm in size) and nanoplastics (NPs with a size defined as either less than 100 or 1000 nm) [14]. Due to the dearth of coordination between the research on the harmful impacts, one may argue that there is not yet sufficient evidence to substantiate a regulatory effort that tackles all the risks that plastics pose to food security, food safety, and ultimately to human health [14]. Consequently, the precautionary principle and the need to take preventive measures can legitimize the policymakers’ anticipatory action even under scientific uncertainty.

2. Towards the Adoption of a Cross-Disciplinary Systems Thinking Approach

This study signifies a step forward in joint research concerning plastic pollution. Its reach extends to the exploration of the potential positive impacts of a systematic regulatory approach to plastics for the environment, human health, and in general the wellness of all living organisms. In this regard, it also marks a step forward in the project SECURE, at the crossroads of

environment, food, and health. It does so by specifying in which terms systemic thinking applied to law and marine science can help tackle plastic pollution at sea.

Consequently, actors and disciplines can find a field of cross-cooperation and continue to develop ways to explore synergies. Two major reflections spur from this systemic approach: 1. How to effectively put it into practice; and 2. How to develop control mechanisms for its proper functioning.

The research community plays a key role in the solutions of the two questions. To test the robustness of systemic thinking and its applications to cross-boundaries issues, it is necessary to invest efforts towards systemic research. The steps of systemic research include developing standards to conduct systemic research, the establishment of a common language (to the extent possible) between the different research disciplines, as well as the implementation of review panels that overview, assist, and review the developments of the research. Examples of the latter can be found within research in healthcare [15].

Such review panels are to be formed by researchers, as well as key users and stakeholders, with the skills and content knowledge to produce and assess systematic research. The tasks in the systemic research fields should therefore be conducted and reviewed by multiple individuals with a wide range of expertise, from scoping studies to developing systemic methods that synthesize the research findings. To reinforce the role of systems thinking in solving complex problems, it would be desirable to introduce such an approach also in education, across the physical, natural, and social sciences [16][17].

While additional research is needed to build empirical support for effective approaches to systems thinking, this article has set the groundwork to facilitate the adoption of such an approach in research, education, and ultimately in decision-making.

Improving the use of systemic research and reviews in decision-making has the potential to provide multi-faceted interventions to limit the impacts of plastic pollution at sea. Collaboration between hard scientists and legal researchers is essential for developing consensus and clarity on regulatory strategies and action plans, thus maximizing the coordination and effectiveness of the intervention measures [9].

Finally, the advancements in systemic approaches are expected to further not only the plastic pollution research field, but also all the related and expectedly impacted ambits, such as food security, food safety, and human health.

3. From Legislation to Implementation: A Comparative Overview of the First Implementing Efforts of Directive EU 2019/904

France and Germany offer two virtuous examples of implementation of the Directive EU 2019/904 [18]. In particular, France has been a pioneer in the introduction of obligations on plastic waste, with the approval of the Law on the Circular economy (Law No. 2020-105 of 10 February 2020 — 'Circular Economy Law') [19]. Among the measures introduced by the law to curb plastics waste, it is worth listing the progressive ban from January 2021 on single-use plastic products; the ban on the import and manufacture of single-use plastic bags intended for sale or for giving-out for free; general limits on the use of plastic [19].

In the wake of implementing the European law, Germany has adopted the Ordinance on Single-Use Plastics (Einwegkunststoffverbotsverordnung, EWKVerbotsV), entered into force on 3 July 2021 [20]. The EWKVerbotsV implements Article 6 (1), (2) and (4) of Directive EU 2019/904, requiring Member States to ensure that the single-use plastic products listed in part C of the Annex to that Directive, whose closures and lids are made of plastic, are placed on the market only if the closures and lids remain attached to the containers during the period of use. The Ordinance also implements Article 7 (1) and (3) of Directive (EU) 2019/904, requiring the EU member states to ensure that the containers listed in Part D of the Annex are only placed on the market if they bear a marking on the packaging or on the product itself.

Both examples bode well in terms of improvements of a MT common regulatory framework, involving multi-actors and multi-action strategies.

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