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The New Horizons of Law and Science through the lens of the Agenda 2030 on Sustainable Development. Some Emerging Issues

Margherita Paola Poto[a,+,*] and Emily Margaret Murray[b]

[a]*Faculty of Law, UiT The Arctic University of Norway; and Department of Management, University of Turin, Italy*

[b]*Faculty of Health Sciences, Global Health, McMaster University, Canada; and Researcher with ECO_CARE, Norway*

Abstract. The complex sustainability challenges of the 21st century need to be addressed through integrated interdisciplinary approaches, combining science, law, and ethics with concrete, timely, and effective solutions. This study offers a legal framework and a case study to the needs posited by the Agenda 2030 on sustainable development. Starting from an analysis of the first part of the Agenda, the article unfolds by exploring the possibility of defining environmental compliance through environmental responsibility, environmental duties, and the virtuous case of agroecology. The case study focuses on a climate-smart practice applied to the sea and delves into the environmental, nutritional, and health benefits of the marine biomass from Northern Norway. The theoretical framework and the case study will emphasize the importance of systemic approaches to sustainability for putting integral ecology models into action.

Keywords: Sustainable development goals, environmental responsibility, deep ecology, agroecology, Agenda 2030, climate-smart practice

1. Introduction

The many challenges of sustainability, such as the need to ensure an adequate level of food security[1] in the context of climate change and a rapidly growing population, while respecting human health and the well-being of the planet's diverse ecosystems, must be addressed through a novel methodological approach, integrating both legal analysis and practical solutions.[2] Conceptually, sustainability has its origins in the biological and ecological sciences and was forged to limit the activities of natural resource extraction and consumption to

*Corresponding author. E-mail: margherita.p.poto@uit.no.

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1 L. Vipham, K. Amenu, S. Alonso, J.B. Ndahetuye, Y. Zereyesus, K. Nishmwe, E. Bowers, D. Mayer, K. Sah, H. Avelaar, D. Grace (2020). *No food security without food safety: Lessons from livestock related research*, in *Global Food Security*, *26*, 100382; M. Uyttendaele, E. De Boek, L. Jacxsens, (2016) *Challenges in food safety as part of food security: lessons learnt on food safety in a globalized world*, *Procedia food science*, 6, pp. 16-22.

2 On the need to adopt integrated and systemic solutions to the sustainability challenges see F. Popa, M. Guillermin, T. Dedeurwaerdere (2017). *Methodological Pluralism* in F. Popa, M. Guillermin, T. Dedeurwaerdere (2015). *A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science*, in *Futures*, 65, 45-56.

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prevent ecosystems from being threatened and endangered.[3] In social sciences, the term is normally seen as a result of sustainable development or as its synonym.[4]

Attempts to address the impacts of human activities on ecosystems have traditionally been based on sectoral approaches, which has ultimately resulted in fragmented actions and sectoral regulatory reforms.[5] The Western-centric environmental law constructs[6] have contributed to the fragmentation and proliferation of measures, representing self-contained regimes and little interaction and cooperation among the thematic fields of law (climate, biodiversity, water crises, air, and land pollution).[7] Such approaches have failed to address the crisis as the connections and synergies between natural and social systems have been largely neglected, compromised, or not sufficiently strengthened.[8] Concerns about systemic and integrated solutions have grown ever since sustainability and participation became prominent concepts and paradigms guiding decision-making and regulation.[9] Now, in the 21st century, it is widely accepted that achieving sustainability requires participated and integral responses from the social, economic, and environmental spheres.[10] However, debates surrounding sustainability have also motivated more fundamental changes in worldviews, which call for integrated perspectives, knowledge systems integration, and co-evolution.[11]

This contribution addresses the need to promote integration among the social, economic and environmental spheres in a two-fold manner: (1) by providing guidance on how to read the Agenda 2030[12] (hereinafter referred to as the Agenda) as a tool for systemic approaches to sustainability and (2) by analyzing a case study related to ocean governance, where connections between natural and social systems are enhanced and developed by interdisciplinary research. The theoretical and practical analysis will focus on the interconnectedness between some of the Sustainable Development Goals (SDGs). In particular, the interactions between SDG 2 (Ending hunger, achieving food security, improving nutrition, and promoting sustainable agriculture), SDG 3 (Ensuring health and well-being for all at all ages), SDG 12 (Ensuring sustainable patterns of production and consumption), SDG 13 (Promoting action, at all levels, to combat climate change) and SDG 14 (Conserving and sustainable use of oceans, seas and marine resources for sustainable development) will be further explored to achieve SDG 17 (Strengthening the means of implementation and renewing the Global Partnership for Sustainable Development).

The case study focuses on a concrete solution to the sustainability challenges offered by the Arctic marine ecosystem of Northern Norway, in terms of food safety and human health benefits. The analysis of the interconnectedness of those SDGs relating to human and planetary health will be complemented by an analysis of the intermediate results of the interdisciplinary project SECURE Novel Marine Resources for Food Security and Food Safety, from UiT The Arctic University of Norway, in Tromsø.[13] Through investigating the nutraceutical and pharmaceutical properties—for atherosclerosis reduction—of the phytoplankton (plankton and benthic algae) biomass at the first level of the marine trophic chain[14], the Norwegian research team hopes

3 L. Schmidt, & J. Guerra (2018). *Sustainability: dynamics, pitfalls and transitions.* Imprensa de Ciências Sociais; A. Delicado, N. Domingos, N., & L. de Sousa (Eds). *Changing societies: legacies and challenges. The diverse worlds of sustainability* (Vol. 3) (pp. 27-53). Colecção Geral.

4 *Ibidem*, 43.

5 K. Brown, K. Viswanathan, K., & M. S. Manguiat (2005). Integrated Responses. *Ecosystems and Human Well-Being: Policy Responses: Findings of the Responses Working Group*, *3*, 425; Poto, M.P. (2020). A Conceptual Framework for Complex Systems at the Crossroads of Food, Environment, Health, and Innovation. *Sustainability*, *12*(22), 9692.

6 D. Bodansky, J. Brunnée, J., & E. Hey (2007). *The Oxford Handbook of International Environmental Law*. Oxford University Press.

7 H. Van Asselt (2014). *The fragmentation of global climate governance: Consequences and management of regime interactions*. Edward Elgar Publishing,

8 K. Brown, K. Viswanathan, K., & M. S. Manguiat (2005), cit., 429.

9 J. N. Rosenau (2017). Globalization and governance: sustainability between fragmentation and integration. In *Governance and Sustainability* (pp. 20-38). Routledge.

10 B. Purvis, y. Mao, & d. Robinson (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainable Science, 14*, 681-695.

11 M. Nissen, M. Kamel, & K. Sengupta (2000). Integrated analysis and design of knowledge systems and processes. *Information Resources Management Journal (IRMJ)*, *13*(1), 24-43.

12 UN Resolution, AG, A/Res/70/1 published on the official website: https://sdgs.un.org/2030agenda, (accessed on 7.7.2022).

13 https://uit.no/research/seafood/project?pid = 66762 last access 07.07.2022.

14 L. Van Hoof, G. Fabi, V. Johansen, J. Steenbergen, X. Irigoien, S. Smith, D. Lisbjerg, & G. Kraus (2019). *Food from the ocean; towards a research agenda for sustainable use of our oceans*' *natural resources*, in *Marine Policy*, *105*, pp. 44-51.

to find an innovative yet practical solution to the environmental, food, and health challenges of our day, exploring the role of the oceans in providing the food and medicine of the future.[15] Biomass, composed of organisms known as primary producers or autotrophs, can independently produce food reserves and transform light energy into metabolic energy through a process of photosynthesis[16] and is particularly appreciated for the high levels of strength, resilience, and ecological compatibility. In general, there is broad consensus in research on the importance of biomass for sustainability: as the only continuous carbon source available on Earth, biomass is a substitute for fossil fuels, reducing greenhouse gas emissions, as well as an attractive feedstock providing environmental and economic benefits.[17] Here, we will observe how dedicating research toward better understanding the properties of biomass and its potential for contributing to a more sustainable future is actually a form of "climate-smart practice" that can respond to some of the challenges posed by the Agenda.

In the following sections, we will first analyze the underlying principles that inform the Agenda (*Section 2*) which will lead to a reflection on the contribution that science and law can make toward the achievement of the goals and targets that compose the Agenda (*Sections 3, 4* and *5*). Then, the case study on the marine ecosystems in Northern Norway, which constitutes a virtuous practice of sustainability and an overall climate-smart practice, will evaluate and emphasize the importance of interconnected solutions in sustainability challenges (*Section 6*) and will be followed by concluding reflections and ways forward in research and action (*Section 7*).

2. "Transforming Our World": the principles underpinning the 2030 Agenda for Sustainable Development

On September 25, 2015, the United Nations General Assembly (UNGA) unanimously approved the Global Agenda for Sustainable Development under the title: "Transforming our world: the 2030 Agenda for Sustainable Development", identifying a set of 17 integrated global goals, composed of 169 targets and 232 unique indicators, which were set to be achieved by 2030. The Agenda, which has been in effect since January 1, 2016, in all 193 United Nations (UN) member states, aims to achieve the set of ambitious goals and targets through interconnected actions and balancing the three dimensions of sustainable development: economic growth, social inclusion, and environmental protection.[18] In the Agenda, the list of the SDGs and their respective goals are preceded by two sections entitled Preamble and Declaration. In the Preamble, the UNGA enumerates the five pillars of the Agenda: people, planet, prosperity, peace, and partnership.[19]

The five pillars provide the foundation to the Agenda through the characteristics of coherence and integrity[20] and, as will be observed, facilitate the understanding and application of the SDGs in an integrated and systemic matter, applied to the objectives and goals of sustainability.[21] Specifically, the commitment that the UNGA undertakes through these pillars is to implement the SDGs in a coherent and integrated way, ending poverty and

15 L. Van Hoof, G. Fabi, V. Johansen, J. Steenbergen, X. Irigoien, S. Smith, D. Lisbjerg, & G. Kraus (2019). *Food from the ocean; towards a research agenda for sustainable use of our oceans' natural resources*, in *Marine Policy*, *105*, pp. 44-51; B. Ferreira, J. Rice, & A. Rosenberg (2016). *The oceans as a source of food*, in *The First Global Integrated Marine Assessment (World Ocean Assessment I). United Nations, USA*.

16 D. Smith, C.J. Brown, C. M. Bulman, E. A. Fulton, P. Johnson, I. C. Kaplan, H. Lozano-montes, S. Mackinson, M. Marzloff, L. J. Shannon, Y.-J. Shin, J. Tam (2011). *Impacts of fishing low–trophic level species on marine ecosystems*, in *Science*, 333(6046), pp. 1147-1150

17 I. Ahmed, et al. Socio-economic and environmental impacts of biomass valorisation: A strategic drive for sustainable bioeconomy.*Sustainability*, 2021, 13.8 : 4200.

18 D. Griggs, M.S. Smith, J. Rockstrom, M.C. Öhman, O. Gaffney, G. Glaser, N. Kanie, I. Noble, W. Steffen, P. Shyamsundar, (2014). *An integrated framework for sustainable development goals*, in *Ecology and Society*,19(4), pp. 1-25

19 D. Tremblay, F. Fortier, J.F. Boucher, O. Riffon, C. Villeneuve (2020). *Sustainable development goal interactions: An analysis based on the five pillars of the 2030 agenda*. *Sustainable Development*, *28*(6), pp. 1584-1596.

20 A. Coopman, D. Osborn, F. Ullah, E. Auckland, G. Long (2016). *Seeing the whole - implementing the SDGs in an integrated and coherent way. Stakeholder forum, bioregional, Newcastle university*, in https://stakeholderforum.org/our-publications-sp-1224407103/reports-in-our-publications/625-seeing-the-whole-implementing-the-sdgs-in-the-an-integrated-and-coherent-way (accessed on 1 May 2022).

21 On systems thinking applied to the Agenda 2030 see E. B. Barbier, J. C. Burgess (2017). *The sustainable development goals and the systems approach to sustainability. Economics: The Open-Access, Open-Assessment E-Journal*,11, 8.

ensuring that all human beings can realize their potential with dignity and equality in a healthy environment (people).[22] This commitment is combined with the protection of the planet from degradation, adopting urgent measures against climate change (planet), and ensuring everyone a prosperous and satisfactory lifestyle, in a context where economic and social progress happen in harmony with nature (prosperity). Furthermore, the UNGA acknowledges the existence of a reciprocal link between sustainability and peace, committing itself to promote peaceful, just, and inclusive societies, free from fear and violence (peace).[23] Finally, for the UNGA, the commitment to achieving the SDGs is only possible through the realized potential of global solidarity, which includes the participation of all countries, stakeholders, and people while ensuring not to neglect the help or contributions from anyone (partnership).[24]

The Declaration is composed of eight subsections, from which it is clear that the Agenda intends not only to reaffirm principles and priorities in sustainable development but also to engage in the implementation of concrete and integrated actions, coordinating science and policy choices through projects centred around these principles.[25] The Declaration makes it clear that the Agenda can only be achieved to its full potential through recognizing everyone's part in contributing to the goals and repeatedly mentions the importance of universal, collective action from stakeholders in both developing and developed nations across the globe. The content of the eight subsections will be briefly summarized below to provide the reader with a sense of the collective approach that is envisioned for achieving the 17 SDGs. The Declaration is comprised of paragraphs 1–59, entitled as follows: Introduction; Our vision; Our shared principles and commitments; Our world today; The new agenda; Means of implementation; Follow-up and review; and A call for action to change our world.

Introduction, Our vision & Our shared principles and commitments

The first two sections express the UNGA's commitment to implementing the Agenda, with all of its interconnected and indivisible objectives, by 2030, declaring that eradicating poverty and its many interrelated economic, social, and environmental challenges is necessary to achieve sustainable development. Inequalities must be combated, building peaceful and inclusive societies, in which the protection of human rights, gender equality, and the emancipation of women and girls are guaranteed along with the protection of the planet and ecosystems (paragraphs 1 to 3). The UNGA undertakes what is termed a major collective journey (paragraph 4), leaving no one behind[26] while ensuring that all segments of society are involved in achieving the SDGs and their targets (paragraph 5). Paragraph 6 highlights that the set of 17 Goals and 169 targets were compiled after years of consultation and collaboration between civil society, governmental and non-governmental organizations, and other stakeholders, which made for a much more inclusive, universal plan compared to the previous framework for ending poverty: the Millennium Development Goals (MDGs)[27].

Specifically, *Our Vision* (paragraphs 7–9) states the ambitious and transformative character of this undertaking: the commitment is to reach a world free from poverty, hunger, disease, violence, and fear, and one that ensures universal access to quality education, health care, safe drinking water, nutritious food, and sustainable energy. The

22 A. Steiner (2018). *The extraordinary opportunity of the 2030 Agenda for Sustainable Development*, in *The European Journal of Development Research*, 30(2), pp. 163-165.

23 J. Fisher, P. Arora, S. Chen, S., Rhee, T. Blaine, D. Simangan (2021). *Four propositions on integrated sustainability: toward a theoretical framework to understand the environment, peace, and sustainability nexus*, *Sustainability science*, 1-21; A. Sharifi, D. Simangan, S. Kaneko (2020). *The literature landscape on peace–sustainability nexus: A scientometric analysis*, in *Ambio*, pp. 1-18.

24 K. Spraul, J. Thaler (2020). *Partnering for good? An analysis of how to achieve sustainability-related outcomes in public–private partnerships*, in *Business Research*, *13*(2), pp. 485-511. A. Pinz, N. Roudyani, N., J. Thaler (2018). *Public–private partnerships as instruments to achieve sustainability-related objectives: the state of the art and a research agenda*. *Public Management Review*, *20*(1), pp. 1-22.

25 G. A. McBean (2021) *Integrating science to address food and health within Global Agenda 2030*, in *Npj Sci Food* 5, p. 8.

26 C. C. Anderson, M. Denich, A. Warchold, J. P. Kropp, P. Pradhan (2021). *A systems model of SDG target influence on the 2030 Agenda for Sustainable Development*, in *Sustainability science*, pp. 1-14; M. Manuel, F. Grandi, S. Manea, A. Kirbyshire, A. E. Lovell (2018) "*Leave no one behind*" *index 2018,* in *ODI Briefing Note. London: Overseas Development Institute*. For a critical analysis see I. T. Winkler, M. L. Satterthwaite, (2017). *Leaving no one behind? Persistent inequalities in the SDGs*, in *The International Journal of Human Rights*, 21(8), pp. 1073-1097; E. Stuart, J. Woodroffe (2016) *Leaving no-one behind: can the sustainable development goals succeed where the millennium development goals lacked?* in *Gender & Development*, *24*(1), pp. 69-81.

27 https://mdgs.un.org/unsd/mdg/Host.aspx?Content = Indicators/OfficialList.htm (accessed 7 July 2022).

UNGA envisions a world where every life form can flourish, fundamental rights are protected,[28] and economic growth is achieved with respect for the environment and biodiversity.

Our shared principles recalls and links the Agenda to the main declarations of international law, referring, among others, to the Charter of the United Nations, the Universal Declaration of Human Rights, the Millennium Declaration, and the sources of international environmental law, starting with the Rio Declaration on Environment and Development, to which a subsection is dedicated, with a renewed commitment to the principle of common but differentiated responsibilities in achieving sustainable development (paragraph 11).[29]

Our World Today, The new Agenda, Means of implementation & Follow-up and review

The UNGA highlights the slightly overwhelming amount of challenges to sustainable development that our world is currently experiencing (paragraph 14), but brings our focus to the window of opportunity (paragraph 15) and stresses the work already done and the objectives still to be achieved. It is necessary to introduce some elements of novelty compared to the MDGs,[30] which are a set of 8 (less-encompassing) goals that came before the implementation of the SDGs. It has been argued that the SDGs are not simply a sequel to the MDGs, but a "reboot"[31] in that the new Agenda is developed from a participatory process and focuses on developing and non-developing nations, and urges for a shift in the narrative around global cooperation and stresses the urgency of needing to take meaningful action. The Agenda presents a more innovative, forward-thinking stratergy which includes the implementation of the goals (e.g. indicating specific targets), reiterates the need to adopt an integrated approach, and considers the deep interconnections and cross-cutting components between the new objectives and targets (paragraph 16–17).

The new Agenda, therefore, underlines the responsibility of the states in the pursuit of the objectives, starting from January 1, 2016. Among the *Means of implementation*, the creation of a Global Partnership (in response to the need for collaboration outlined above) plays a central role.[32] The Global Partnership requires the creation of a structure supported by concrete policies and actions, involving global institutions at different levels, including the states and national parliaments (points 41 and 45), the Small Island States developing (SIDS),[33] landlocked developing countries,[34] the African Union,[35] and countries in situations of conflict (point 42).

The responsibility for monitoring and reviewing the actions taken in attempt to achieve the SDGs is placed on Control and Audit, undertaking to the development of specific indicators to facilitate this activity and strengthen the statistical capacities of developing countries (including African countries, least developed countries, landlocked developing countries, small island developing countries and middle-income countries: point 48).

A call for action to change our world

Finally, in the section *A call for action to change our world*, the UNGA reiterates the central role played by all people in the journey towards sustainable development, along with the involvement of civil society,

28 S.R. Cal Seixas, J. L. De Moraes Hoefel (2022) *Building New Perspectives and Approaches to Our Common Future on Climate Change and Subjectivity: Agenda 2030 and Human Rights*, in.R. Cal Seixas, J. L. De Moraes Hoefel. *Quality of Life, Environmental Changes and Subjectivity*, pp. 69-81, Palgrave Macmillan, Cham.

29 L. Meuleman, I. Niestroy (2015) *Common but differentiated governance: A metagovernance approach to make the SDGs work*, *Sustainability*, 7(9), pp. 12295-12321.

30 https://mdgs.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm last access 07.07.2022.

31 https://www.oecd.org/fr/economie/development-posts-sdg-reboot-or-sequel-mdg.htm last access 01.07.2022.

32 On the importance of the global collaboration see E. Palmer (2015). *Introduction: The 2030 Agenda*, in *Journal of Global Ethics*, 11(3), pp. 262-269.

33 A. Thomas, A., Baptiste, R. Martyr-Koller, P. Pringle, K. Rhiney (2020) *Climate change and small island developing states*, in *Annual Review of Environment and Resources*, *45*, pp. 1-27.

34 M. L. Faye, J. W. McArthur, J. D., Sachs, T. Snow (2004). *The challenges facing landlocked developing countries*, in *Journal of Human Development*, *5*(1), pp. 31-68.

35 For a critical response to these inclusions G. Novovic (2021) *Can Agenda 2030 bring about "localization"? Policy limitations of Agenda 2030 in the broader global governance system*, in *Development Policy Review*, pp. 1-16. For a critical response from the African Union see Commission, AUC (2015). *Agenda 2063: The Africa we want. First Ten-Year Implementation Plan*, 2013-2023.

indigenous groups, public and private sectors, the scientific community and all levels of governments (points 51–53). According to the UNGA, the current generation can become "the first generation to succeed in ending poverty; just as we may be the last to have a chance of saving the planet" (point 50).[36]

3. The responses of environmental law to the challenges of sustainability

The two sections of the Agenda as described above contain statements that, if not accompanied by the assumption of responsibility and actual plans of action, risk remaining empty, rhetorical statements of principle—also defined by the doctrine of the 'fantasmatic narrative'[37] or 'unsustainable lightness'.[38] Using a critical lens, we will illustrate how the legal sciences, and in particular the administrative law on the environment, can offer tools for concrete implementation strategies to give substance to the declarations and objectives of the Agenda.

In a recent study, Friedrich Schneider et al. argue that science should play a central role in giving content to the rhetoric of sustainability and has the potential to respond to the needs stated by the UNGA.[39] The Agenda represents a fundamental turning point in the dialogue between science and policy and encourages the scientific community to be more reflective and engaging with how the values and definitions of sustainability are incorporated into research agendas. Although science has been recognized as a crucial factor in achieving sustainability for several decades, Schneider et al. argue that the role of science has shifted from simply informing policy decisions to actively generating knowledge that can lead to effective, integrated solutions for achieving the 17 SDGs. Through knowledge co-creation and aligning research objectives with the Agenda's vision of sustainability, science can influence political choices and the consequent practical applications that are implemented for achieving sustainability.

This section will explore and suggest the need to intersect the Agenda with science, an argument raised by the study of Schneider et al., also in terms of legal science, illustrating the relevance of ethical-legal liability by providing the interpreter with a key to understanding the sustainability objectives in terms of environmental responsibilities, duties, and obligations.

The study highlights how environmental law can contribute to generating "knowledge that helps humanity achieve sustainability."[40] The process of generating knowledge to help achieve sustainability, in the opinion of the writers, can be divided into at least two phases or meanings: 1) a definitional-epistemological (first phase) that offers the theoretical framework and 2) concrete solutions (second phase). In the first phase, the ethical-philosophical foundations of environmental law contribute to the UNGA's commitments in terms of ecological interdependence and environmental responsibility, based on studies by Arne Næss[41] and Hans Jonas[42], respectively. As will be further explained, in both cases, the ethical-philosophical reflections of the two authors had important repercussions in the environmental legal sciences, by introducing the concepts of deep ecology and ethical responsibility, respectively.

The consequences of recognizing the deep interconnectedness of relationships in ecology, and the affirmation of human responsibility towards nature, are translated in legal terms into duties and obligations towards humanity and

36 Critically on the Agenda see J. Telleria, J. Garcia-Arias (2021) *The fantasmatic narrative of* '*sustainable development*'. *A political analysis of the 2030 Global Development Agenda*, in *Environment and Planning C: Politics and Space*, 23996544211018214.

37 J. Telleria, J. Garcia-Arias (2021) *The fantasmatic narrative of* '*sustainable development*'. *A political analysis of the 2030 Global Development Agenda,* cit.

38 I. Capurso, E. Talusso, A. Marini, L. Bonardi (2020). *L'insostenibile leggerezza della sostenibilità: i limiti dell'attuale ecopolitica*, in *Geography Notebooks*, *3* (2), pp. 147-165.

39 F. Schneider, A. Kläy, A.B. Zimmermann, T. Buser, M. Ingalls, P. Messerli (2019) *How can science support the 2030 Agenda for Sustainable Development? Four tasks to tackle the normative dimension of sustainability*, *Sustainability Science*, 2019, vol. 14, pp. 1593-1604.

40 Ibidem, p. 1594.

41 A. Næss (1973) *The shallow and the deep, long-range ecology movement. A summary.* in *Inquiry*, Vol.16, n°1-4,1973, p. 95.

42 H. Jonas (1985). *The imperative of responsibility: In search of an ethics for the technological age*. University of Chicago press.

nature (e.g., the duty of humans to protect human and nature rights,[43] and responsibility in case of damage). Within the framework of these ethical and legal premises and as a second meaning and concrete manifestation of the need to give an effective response (hence, responsibility) to complex environmental problems, climate-smart practices, also referred to as agroecological practices, have been flourishing within the system of agroecology.[44] Such practices, addressing the link between food security and climate change, can be considered examples of concrete solutions in which the aforementioned environmental duties and obligations are expressed. Agroecological practices, as will be explained in more detail in *Section 5*, encapsulating a wide range of practical solutions of action duties and responsibilities within the system of multilevel environmental governance (for example, but not limited to, the European level) contributing to generating new knowledge in the service of sustainability.

4. Ecological interconnection and environmental responsibility

It is widely accepted that the notion of achieving sustainability requires participated and integrated responses from the social, economic, and environmental spheres.[45] However, debates surrounding sustainability have also motivated more fundamental changes in worldviews, which call for integrated perspectives, knowledge systems integration, and co-evolution.[46] Human societies co-evolve with nature through dynamic and reflexive processes occurring at different levels of governance, from local to global.[47] An emerging body of theory defines such coevolving systems as linked socio-ecological systems and agrees on the relevant role that environmental law has been playing in facilitating the focus on such interconnectedness.[48] The discourse of environmental law can add a definitional and epistemological layer to sustainability research through the concepts of 'deep interconnectedness' and 'environmental ethics' which can be argued to be fundamental prerequisites for making the objectives of the Agenda effective and implementable. Studies on the interconnectedness in deep ecology were carried out by the Norwegian ecophilosopher Arne Næss.[49] The merit of Næss' reflections was to analyze the change of awareness in ecology—a system based exclusively on human elements related to the environment (anthropocentrism)—which has progressively focused on the system and the fabric of relationships between living, human and non-human beings (relational ecocentrism). The driving force of deep ecology, according to Næss, is identification and solidarity with all forms of life; deep ecology considers the awareness of all the relationships that form the earth system and goes beyond a "shallow ecology" approach that merely focuses on managing pollution and resource depletion, and its effects on human beings (rather than all life forms). In this sense, the natural and cultural environment is not a mere background of human life, but its matrix, *oikos*, home.[50] Continuing on the path marked by Næss, bioethics scholar Luca Valera recalls that:

> Deep ecology is both a philosophical current and a form of ecological activism. Let us say that deep ecologists follow the following path: they start from the denunciation of the "continuous ecological crisis" of "technocratic-industrial" societies; they identify environmental issues as a crisis of "nature and culture"; after that—they think—the remedies must be of the same depth, that is, they require a genuine individual and social change, an ethical and political change.[51]

43 M. P. Poto (2022) *Environmental Law and Governance: The Helicoidal Pathway of Participation a study of a nature-based model inspired by the Arctic, the ocean, and indigenous views*, Giappichelli Editore, Torino, pp. 96-131.

44 S. Saj, E. Torquebiau, E., Hainzelin, J., Pages, F., Maraux (2017) *The way forward: An agroecological perspective for Climate-Smart Agriculture*, in *Agriculture, Ecosystems & Environment*, *250*, pp. 20-24.

45 B. Purvis, Y. Mao, Y., & D. Robinson (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainable Science, 14*, 681-695.

46 M. Nissen, M. Kamel, & K. Sengupta (2000). Integrated analysis and design of knowledge systems and processes. *Information Resources Management Journal (IRMJ)*, *13*(1), 24-43.

47 Berkes, F., & Folke, C. (1992). *A systems perspective on the interrelations between natural, human-made and cultural capital*. Beijer International Institute of Ecological Economics, the Royal Swedish Academy of Sciences.

48 S. M. Subramanian (2010). Traditional knowledge and biodiversity: Can the co-evolution of the natural and social systems continue. *Traditional knowledge in policy and practice: Approaches to development and human well-being* (pp. 226-39). United Nations.

49 A. Næss (1973), cit., p. 96.

50 Ibidem, p. 96.

51 L. Valera (2011). *Ecologia e ecologie,* in *Journal of History of Medicine*, 23/3 (2011), pp. 1015-1044. Translated into English by the authors.

In the scientific field, the reflections on the integrality and interconnectedness of ecology are framed within the movement of systems thinking, fundamental for the understanding of systems of any kind, be they living organisms, social systems, or ecosystems.[52] Systems thinking recognizes the world as an integrated system, rather than a set of individual elements that exist within their own societies or microcosms. From this critical ecological perspective, the Agenda can and should be viewed as an integrated framework that leads to overall sustainability rather than a set of individual goals and targets that do not influence each others' achievement. Following this reconstruction, and according to the proponents of the systems thinking approach, it is impossible to separate any phenomenon from all the others, and therefore to separate nature, society, law, and ecology.[53] Thus, achieving sustainability implies a collaboration across several disciplines and with different systems to meet the objectives of all 17 SDGs.

This system of relationships is based on an ethical imperative, which Hans Jonas has defined as the ethics of responsibility.[54] In studying the relations between humanity and nature, Jonas expresses himself in terms of service and care of humanity—and not of domination— towards the biosphere, the elements that Jonas defines as "extra-human". Such care constitutes and finds a new ethic of responsibility, which extends to the extra-human, and therefore to the biosphere defined as both a system and as parts of the system: "it is at least not senseless anymore to ask whether the condition of extra-human nature as a whole and in its parts, now subject to our power, has become a human trust [...]. It would mean to seek not only the human good but also the good of things extra-human [. . .]."[55] In this new ethic of responsibility, reference to future generations plays a leading role: the duties of service and care towards the human and extra-human elements in the biosphere must be translated, according to Jonas, into public and collective policies aimed at protecting future generations.[56]

Putting this concept of ecological responsibility into legal terms, and then implementing it as part of regulations and policies at the national and global level, is one of the major challenges that affect legal research on environmental issues of our time. A group of scholars, coordinated by Michele Carducci, has carried out this need for systematization of responsibility, proposing to positivize fundamental rights of nature, environmental rights for all, and collective duties to ensure the protection of both. The model of the rights of nature has recently been systematized and has resulted in the study proposal of the "Charter of Fundamental Rights of Nature of the European Union"[57]—the first concrete response at the EU regulatory level in support of an ethics of responsibility approach. The institutional debate on the recognition of nature rights within the EU and its Member States is also a sign of a correspondence between the programmatic objectives of the Agenda, the contributions of ethics scholars, and environmental law. With this in mind, the proposal to standardize environmental liability through a system of rights and obligations aims to establish a framework for the recognition of nature rights in the EU legal order, as a prerequisite for a different, yet better relationship between human beings and nature.

The first issue worthy of mentioning is the finding that environmental law uses an incorrect approach to governing nature, which separates human and non-human interests, and limits the protection of the ecological balance to limited territorial areas (natural habitats, reserves, protected areas). Hence the proposal for a definition of ecological balance to be protected to ensure the survival of all living things for the present and the future, not solely the survival of human beings. In addition to this prediction, and in line with the repeatedly stressed need to formulate duties of intergenerational solidarity towards nature, the Charter elaborates on the definition of environmental duties, and therefore of responsibility, which are expressed in actions aimed at: (1) the immediate abandonment of human activities that alter ecosystem functions, accelerate climate change and further global

52 F. Capra, P. L. Luisi (2014). *The Systems View of Life: A Unifying Vision*. Cambridge: Cambridge University Press. doi:10.1017/CBO9780511895555.

53 F. Capra, U. Mattei, (2015), *The Ecology of Law. Toward a legal system in tune with nature and community*, Berrett-Koehler Publishers.

54 H. Jonas (1985), cit.

55 H. Jonas (1985). *The imperative of responsibility: In search of an ethics for the technological age*. University of Chicago Press, p. 8.

56 H. Jonas (1985), cit., p. 10.

57 M. Carducci, S. Bagni, M. Montini, I. Mumta, V. Lorubbio, A. Barreca, C. Di Francesco Maesa, E. Musarò, L. Spinks, P. Powlesland (2020). *Towards an EU Charter of the Fundamental Rights of Nature. Study*, Brussels: European Economic and Social Committee: https://www.eesc.europa.eu/sites/default/files/files/qe-03-20-586-en-n.pdf last access 02.05.2022.

warming of the planet; (2) the recovery and protection of biodiversity; and (3) maintaining the climate stability of the present and the future.[58]

The hope is that this proposal will be accepted and implemented through integrated practices of nature protection; fortunately, this hope does not seem too far from reality. Agroecological practices (also considered "climate-smart" practices), such as the one illustrated in *Section 6*, provide examples of environmental responsibility in action and demonstrate how multilevel governance systems are recognizing the significance of deep and integral ecology, extolling environmental duties through actions that pursue sustainability objectives in an integrated and interconnected way.

5. Environmental responsibility in action: agroecological practices

Looking at the Agenda's commitments and objectives from the perspective of environmental responsibility is crucial to ensure that the UNGA's statements regarding sustainability are effective and practical. The role that environmental law plays is not limited to the epistemological realm, since the scope of the definition of environmental responsibility also has practical implications and translates into concrete actions in the system of multi-level governance and within the European Union.[59]

Here, and especially in the context of the challenges to sustainability linked to food security and the protection of the ecosystem, it is worth briefly dwelling on the actions attributable to the category of climate-smart agriculture and agroecological practices that facilitate the agroecological transition within the food systems around the globe.[60] Such practices adopt an agroecological approach to the design and management of sustainable food systems. In particular, the expression "agroecological practices" is linked to an approach promoted by FAO since 2010,[61] aiming to create technical conditions, policies and investments for sustainable development, which give a concreate *response* (hence the link with the concept of environmental respons"*ability*"), understood as the ability to provide tangible solutions through integrated actions[62] to challenges relating to climate change. Further, the FAO defines agroecology as "a holistic and integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of sustainable agriculture and food systems."[63] The elements and values of agroecology and its practices align with the concepts introduced by Næss, Valera, and Jonas; thus, an agroecological approach is a promising one that integrates ethical and philosophical foundations of environmental responsibility into the policies, regulations, and practices contributing to a sustainable future.

One of the main focuses of agroecological practices is the commitment to ensuring food security: the accessibility and availability of food produced through ecologically-friendly agricultural practices and production systems. These practices constitute, in this sense, practical applications of an integrated and related responsibility in the three dimensions of sustainable development (economic, social, and environmental). They respond and adapt to local conditions, and provide coordination between sectors closely related to agriculture (livestock farming, agricultural and forestry practices, fisheries) and the energy and water sectors, in order to enhance synergy and optimize the use of natural resources and the conservation of ecosystems.[64] Examples of

58 M. Carducci, S. Bagni, M. Montini, I. Mumta, V. Lorubbio, A. Barreca, C. Di Francesco Maesa, E. Musarò, L. Spinks, P. Powlesland (2020). *Towards an EU Charter of the Fundamental Rights of Nature. Study,* cit..

59 M. P. Poto (2022), cit., pp. 96-131.

60 S. R., Gliessman, E. Engles, R. Krieger (1998). *Agroecology: ecological processes in sustainable agriculture*. CRC press; S. R. Gliessman (2004) *Agroecology and agroecosystems*, in *Agroecosystems analysis*, *43*, 19-29; ID. (2018). *Defining agroecology*, in *Agroecology and Sustainable Food Systems*, *42*(6), pp. 599-600; Id. (2020). *Transforming food and agriculture systems with agroecology*, in *Agriculture and Human Values*, *37*(3), 547-548.

61 FAO Report, (2010) "*Climate-Smart*" *Agriculture Policies, Practices and Financing for Food Security, Adaptation and Mitigation*, 2010, cit.

62 S. Sterling (2014) *At variance with reality: How to re-think our thinking*, in *Journal of Sustainability Education Vol. 6,* pp. 1-10.

63 Source: https://www.fao.org/agroecology/home/en/ (accessed on 1 July 2022).

64 M. Taylor (2018) *Climate-smart agriculture: what is it good for?*, in *The Journal of Peasant Studies*, *45*(1), pp. 89-107; A. Chandra, K.E. Mcnamara, K. E., P. Dargusch (2018). *Climate-smart agriculture: perspectives and framings*, in *Climate Policy*, *18*(4), pp. 526-541; L. Lipper, N. Mccarthy, D. Zilberman, S. Asfaw, G. Branca (2017) *Climate smart agriculture: building resilience to climate change*, p. 630. Springer Nature; L. Lipper, P. Thornton, B. M. Campbell, T. Baedeker, A. Braimoh, M. Bwalya, P. Caron, A. Cattaneo, D. Garrity, K. Henry, R. Hottle, L. Jackson, A. Jarvis, F. Kossam, W. Mann, N. Mccarthy, A. Meybeck, H. Neufeldt, T. Remington,

climate-smart practices include, but are not limited to, agroforestry, cover crops, green manure, and intercropping.[65] Generally, climate-smart practices refer to the agriculture sector and include technologies and approaches that are applied to the land; for example, a climate-smart practice might include working with farmers to improve soil conditions (e.g. conserving soil moisture[66]) which targets food insecurity challenges from an economic standpoint (increased crop yield, increased availability of food) and an environmental standpoint (prevents land degradation and conserves natural ecosystems). As will be further illustrated, the case study in *Section 6* offers an example of climate-smart practice, but rather than applying environmentally-sustainable practices to the land, this climate-smart practice is applied to the ocean.

Within the EU, at least at a policy-making level, these practices are regulated by the Common Agricultural Policy (CAP),[67] in the part where the EU undertakes the commitment to ensure interventions aimed at the transformation of the agri-food system into an agroecological key.[68] To date, however, efforts to promote practices that follow an agroecological approach are still lacking and poorly coordinated. The promotion of these practices is a positive sign from the EU policymakers to provide concrete examples of implementing action for environmental responsibility. However, political and institutional reforms are needed, at the European and national levels, so that agroecological practices are upscaled, and made equally and widely accessible to everyone to effectively achieve the aim of the Agenda 2030.[69] Specifically, agroecological policies and practices contribute to achieving SDGs 2, 3, 12, 13 and 14—all of which are related to poverty and hunger eradication, promoting prosperous lives for the current and future generations, protecting the environment, and combating climate change.

6. A case study

The case study illustrated here concerns an interdisciplinary empirical example of climate-smart practice applied to the ocean. The research is conducted with the specific aim to offer an effective, integrated response to the challenges of sustainability posed by SDGs 2, 3, 12, 13, and 14. The case is geographically located in the coastal area of northern Norway, at the point of convergence between the Norwegian Sea and the Barents Sea (so-called European Arctic Ocean),[70] on the coasts of the county of *Troms og Finnmark* (County of the indigenous region Sápmi: *Romssa ja Finnmárku*).[71]

The coastal area of the Arctic is characterized by features such as extensive glacial cover and extreme variations in light radiation conditions, which allow for the development of unique marine ecosystems.[72] Due to the frost and thaw cycles, the formation of rich habitats is very common near the illuminated surface of the sea. The vast continental undersea plateaus create vast shallow seas, such as the Barents Sea, where the freshwater of the rivers flowing into the sea creates the conditions typical of an estuary (where the tide meets a large river). The primary

Pham Thi Sen, R. Sessa, R. Shula, A. Tibu, E. F. Torquebiau (2014) *Climate-smart agriculture for food security*, in *Nature Clim Change*. 4, pp.1068–1072.

65 A. Wezel, M. Casagrande, F. Celette, F. *et al.* Agroecological practices for sustainable agriculture. A review. *Agron. Sustain. Dev.* 34, 1–20.

66 Source: https://www.cimmyt.org/news/climate-smart-agriculture-a-winning-strategy-for-farming-families-in-el-nino-seasons/ last access 07.07.2022.

67 https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/new-cap-2023-27_en (accessed on 2 May 2022).

68 B. Hasler, M. Termansen, H. Ø. Nielsen, C. Daugbjerg, S. Wunder, U. Latacz-Lohmann, U. (2022). European agri-environmental policy: Evolution, effectiveness, and challenges. *Review of Environmental Economics and Policy*, *16*(1).

69 B. Hasler, M. Termansen, H. Ø. Nielsen, C. Daugbjerg, S. Wunder, U. Latacz-Lohmann, U. (2022), cit.

70 M. L. Druckenmiller, T.A. Moon, R. L., Thoman, T.J. Ballinger, L.T. Berner, G. H. Bernhard, U.S. Bhatt, J. W. Bjerke, J. E. Box, R. Brown, J. Cappelen, H. Christiansen, B. Decharme, R. Ziel (2021) *The Arctic*, in *Bulletin of the American Meteorological Society*, *102*(8), pp. 263-316.

71 S. G. Denisenko (2004) *Structurally-functional characteristics of the Barents Sea zoobenthos*, in *Proc. Zool. Inst. Russ. Acad. Sci*, *300*, pp. 43-52.

72 E. E. Syvertsen (1991) *Ice algae in the Barents Sea: types of assemblages, origin, fate and role in the ice-edge phytoplankton bloom*, in *Polar Research*, 10(1), pp. 277-288.

producers, also known as low-trophic marine species, in these coastal marine waters consist of 200–300 species of microscopic plant organisms (phytoplankton), of which half are diatoms.[73]

When the flowering period of the phytoplankton coincides temporally with the grazing of the animal plankton (zooplankton), almost all the flowering is utilized as food; however, when the flowering and grazing periods do align, most of the flowering is not utilized in the pelagic food chain and ends up falling to the seafloor where it is then stored. Zooplankton is characterized by a few dominant species: in particular, crustaceans constitute the numerically dominant group, and among these, the copepods of the *genus Calanus* play a key role in the Arctic ecosystems.[74] The *Calanus finmarchicus*, for example, is a characteristic species of the northern coastal region of Norway and is the most important in the process of biomass generation, with the fundamental ecological role as the main source of nourishment for herring, capelan, cod, and other marine organisms that feed on plankton.[75]

Within this context, the research group of the SECURE project maps and categorizes best practices related to marine species (primary producers in coastal areas), the composition of nutrients and contaminants in those species, and their effects on the animal and human gastrointestinal microbiome and cardiometabolic health.[76] In addition, the objectives of the SECURE project include the exploration of the therapeutic and pharmaceutical properties of such marine biomass that could potentially contribute to the treatment of atherosclerosis. The argumentation of the researchers is that the study and testing of the nutritional properties of the Arctic marine biomass is one way in which science and law can work together to find innovative solutions to the many sustainability challenges highlighted in the Agenda. With food safety and food security being an overlapping issue among several SDGs, exploring the possibility of new sustainably-sourced and nutritional foods from the marine environment is very relevant to a growing global population. Investigating and using biomass for its therapeutic, pharmaceutical, and nutritional properties can also be considered as being environmentally beneficial since the collection of marine biomass would be an alternative and certainly a sustainable practice that would help to counteract the overfishing phenomenon.[77] Along with the general objective of offering a systematic and interdisciplinary response to the challenges of the Agenda, the research group specifically aims to contribute to the aforementioned SDGs 2, 3, 12, 13, and 14.[78] The interdisciplinary research group (composed of biologists, food experts and environmental jurists) has developed cutting-edge research approaches in their respective disciplines involved in conditions of scientific uncertainty,[79] providing insights for solving complex sustainability challenges through innovative research solutions, such as the protection of the marine environment, food safety and security, and human and animal health. Overall, the SECURE project is an example of a climate-smart practice (applied to the ocean) in that the knowledge gathered on the nutritional and medicinal properties of biomass and how to ethically and consciously harvest the benefits of such a marine species can contribute to a more sustainable future.

The first part of the project has taken an ethical-legal dimension, focusing on the need to develop a matrix that conceptually includes the objectives of the 2030 Agenda and its 17 SDGs from a legal perspective, and allowing for the redefinition and extension of agroecological practices from the marine system.[80] Thus far, this research has led to the development of a critical conceptual framework that includes the systematic mapping of the interactions between the SDGs, which can inform the optimization and upscale of climate-smart practices applied

73 E. E. Syvertsen (1991), cit., p. 280.

74 I. H. Ellingsen, P. Dalpadado, D. Slagstad, H. Loeng (2008) *Impact of climatic change on the biological production in the Barents Sea*, in *Climatic change*, *87*(1), pp. 155-175.

75 G. Arnkværn, M. Daase, K. Eiane (2005) *Dynamics of coexisting Calanus finmarchicus, Calanus glacialis and Calanus hyperboreus populations in a high-Arctic fjord*, in *Polar Biology*, *28*(7), pp. 528-538.

76 M. P. Poto, E.O. Elvevoll, M. A. Sundset, K. E. Eilertsen, M. Morel, I.J. Jensen (2021) *Suggestions for a Systematic Regulatory Approach to Ocean Plastics*, in *Foods*, 10(9), p. 2197.

77 R. D. Methot Jr,G. R.Tromble, D. M. Lambert, K. E. Greene (2014) *Implementing a science-based system for preventing overfishing and guiding sustainable fisheries in the United States*, in *ICES Journal of Marine Science*, *71*(2), pp. 183-194

78 P. Williamson, C. M. Turley (2016) *How can we minimise negative effects on ocean health? Policy card E1-E2*. AVOID and UKOA programmes, pp. 1-2.

79 C. Battistoni, C. Giraldo Nohra, S. Barbero (2019) *A systemic design method to approach future complex scenarios and research towards sustainability: A holistic diagnosis tool*, in *Sustainability*, 11, p. 4458.

80 M. P. Poto (2020) *A conceptual framework for complex systems at the crossroads of food, environment, health, and innovation*, *Sustainability*, *12*(22), 9692.

to the ocean.[81] In detail, the systems thinking approach applied in this case identifies different building blocks or subsystems (which, in the terminology of the Agenda 2030, correspond to zero hunger, health, climate action, innovation, and life below water, among others).[82] Thus, the systems thinking approach helps to develop a study of the interconnectedness between such blocks to achieve food security, good health, and environmental and marine ecosystems protection.[83] Further, this systems thinking approach goes hand in hand with the agroecological approach promoted by the FAO and the concepts of environmental responsibility and deep ecology; analyzing the Agenda from this perspective can and should lead to integrated actions towards achieving a more sustainable future across all sectors. In a *de jure condendo* perspective, the SECURE research team proposes to identify the active role of the legislator in taking into account these blocks and objectives and regulating climate-smart practices based on this matrix. The blocks in themselves and their interaction entail identifying parts and wholes (such as achieving the SDG right 'food for all' as a part of the food system, and achieving a satisfactory level of health for the growing population as a part of the overall health system).[84] As a concluding remark of the first phase of the project, the team argued that a regulatory approach informed by blocks and objectives could be the first step to framing climate-smart practices from a legal point of view and thus facilitating their upscaling, offering a legal response to the need of finding integrated solutions to the complex challenges of sustainability.[85]

On these theoretical premises, the second phase of the SECURE project explored the possibility of applying systems thinking as a way to develop an increased understanding of the interdependence of health across the diverse species and systems within the biosphere (linking ocean health with human health).[86] The theories of Næss'and Jonas, which were discussed in *Section 4,* were used as a lens to explore the profound interconnections between human and extra-human elements in the ecosystem, and the importance to achieve ocean health was connected to the need to achieve global health for all. The relation between human and extra-human needs is also developed by integral ecology, which supports the concept of the Earth as an integrated system.[87] In particular, integral ecology is the approach that observes the interconnections of the living systems, be they living organisms, social systems, or ecosystems, and how to regulate them.[88] Under the integral ecology concept, for example, there is no distinction between the natural world and human beings (both have agency, rights to life and to regenerate), and no distinction between the health of the environment (water, plants, animals, soil) and the health of humans. Through the lens of integral ecology, a risk posed to the natural environment has consequences for all living beings. Essentially, integral ecology advances the development and application of comprehensive and integrated approaches to sustainability issues, providing comprehensive, far-sighted, and flexible solutions for the environmental solutions that can restore the relationship, at multiple scales, with the earth.[89]

The legal matrix built in the first two phases of the research project was then applied to map out possible solutions to environmental threats posed by micro- and nanoplastics. Again, the relationship between ocean health and global health was scrutinized through the lens of the systems thinking approach: in this case, the research group agreed that only through ad hoc regulatory solutions, integrated and systematized within a multi-level environmental governance framework, is it possible to find effective responses to the emergency caused by anthropogenic environmental threats.[90]

In conclusion, solutions such as the one sought in the SECURE project would most likely lead to consolidating the sustainable development of marine and land agroecological practices. The research shows that the model

81 M. P. Poto (2020), cit., p. 9693.

82 P. Checkland, J. Poulter (2020). *Soft systems methodology*, in *Systems approaches to making change: A practical guide*, pp. 201-253. Springer, London.

83 M. P. Poto (2020), cit., p. 9693.

84 M. P. Poto (2020), cit., p. 9693.

85 G. J. Edgar, A.E. Bates, T. J. Bird, A. H., Jones, S. Kininmonth, R. D. Stuart-Smith, T. J. Webb, (2016). *New approaches to marine conservation through the scaling up of ecological data*, in *Annual Review of Marine Science*, *8*, pp. 435-461.

86 B. A. Wilcox, A. Aguirre, One ocean, one health. *EcoHealth*, 2004, 1.3 : 211-212.

87 E. O'Neill (2016). *The Pope and the environment: Towards an integral ecology?*, in *Environmental Politics*, *25*(4), 749-754.

88 Pope Francis (2015) Laudato Si': Encyclical Letter on Care for Our Common Home (Rome, 24 May 2015) 10.

89 M. P. Poto (2020) *A conceptual framework for complex systems at the crossroads of food, environment, health, and innovation*, cit., 9695.

90 M. P. Poto, E.O. Elvevoll, M. A. Sundset, K. E. Eilertsen, M. Morel, I.J. Jensen (2021). *Suggestions for a Systematic Regulatory Approach to Ocean Plastics*, cit., p. 2197.

to be pursued, once again, is the result of a systemic integration of several elements from both ecological and sustainable practices. In fact, they are the result of the interpretation and communication of knowledge from different scientific disciplines (biology, food science and law science) for better ecosystem management of marine biological resources.

This scientific collaboration leads to the development of predictive models based on an integrated multi-species analysis of biological data, trophic network structures, environmental data and anthropogenic impacts, and requires an interdisciplinary study on the adaptation of European, national and regional legislation in their favor. Such a study and development of predictive models, integrating the many attributes of sustainability, can contribute to the improvement of the environmental, landscape, ecological, social, cultural, and economic conditions of coastal communities, by moving toward truly sustainable blue growth.[91]

7. Conclusions

The analysis reveals the need to address the multi-level challenges of global sustainability, through the study and promotion of integrated actions. In particular, it analyzes the central role that the Agenda plays as a driving force for the achievement of interconnected objectives. From the analysis of the structure of the Agenda, it was then observed how the sciences, and in particular the legal sciences, play an important role in defining the operational tools for the implementation of the provisions of principle. Among these instruments, the ethical-juridical category of responsibility, which includes human duties towards the environment, has been analyzed in detail. The narrative of responsibility has then been translated into practical terms, through the study of agroecological practices.

The regulation of such practices is still programmatic; therefore, it is useful that these rules (with flexibility) can be effectively applied through measures to implement the CAP. The discussion then focused on a case study that demonstrates how agroecological practice can be applied to the marine environment. From the case study, it emerges that agroecological practices must be studied and implemented with interdisciplinary and systemic approaches.

This paper ends with two brief concluding remarks. First, it is noteworthy how the SDGs can act as a compass for environmental law studies, indicating the new horizons of administrative law. Collective action, common good and public interest emerge as the underlying vision towards achieving the 17 SDGs of the Agenda, in the guise of an interconnected system of goals to be achieved for the protection of the planet, people, prosperity, peace and respect for the principle of cooperation. In the pursuit of these objectives, administrative law is critically revisited, the dynamics between state, authority and citizens are re-read in the key of integrated and equidistant relations, and the acknowledgment of rights and duties towards nature highlights the need to rethink legal responsibility through solutions that can be implemented in practice. Secondly, the application of a key to the systemic interpretation of the SDGs proposes a theme dear to the administrative legal scholarship, and in particular to the school of thought that refers to Feliciano Benvenuti.[92]

According to Benvenuti, legal methodology, and administrative law, in particular, must follow and be inspired by the scientific method of investigation.[93] The reflections developed here, on the need to adopt a scientific method in reading the objectives of sustainable development on the one hand, and the need to map concrete responses in the field of agroecology on the other, offer reasons to hope that the wish of Benvenuti is being realized thanks to the systemic and integrated vocation promoted by the Agenda 2030. It has been observed that science influences and contributes to legal decisions regarding the environment; and that environmental administrative law is moving in the direction of enriching the scientific debate on sustainability. Due to the influence of ethical-legal reflections, the scientific community is confronted with issues relating to the concept of responsibility (both individual and collective) to protect, guard, restore nature, and find solutions to the environmental challenges of our time. From

91 A. M. Eikeset, A. B. Mazzarella, B., Davíðsdóttir, D.H. Klinger, S.A. Levin, E. Rovenskaya, N.C. Stenseth (2018) *What is blue growth? The semantics of* "*Sustainable Development*" *of marine environments*, in *Marine Policy*, 87, pp. 177-179.

92 F. Benvenuti (1994) *Il nuovo cittadino. Tra libertà garantita e libertà attiva*, Marsilio, Venezia, 122.

93 F. Benvenuti (1994), cit., p. 124 and ff.

this perspective, and within the systemic framework drawn up by the 2030 Agenda, the interactions between administrative law and environmental science fulfill Benvenuti's wish: law and science are intimately connected, influencing each other to pursue the common good.

Although the road to the achievement of the objectives of the Agenda appears to be still uphill, it is motivating to find that environmental administrative law plays an important role in contributing to the increased awareness of the need to care for the Earth and its inhabitants.