NMUN • GALAPAGOS

UNITED NATIONS ENVIRONMENT ASSEMBLY
BACKGROUND GUIDE 2018

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NATIONAL MODEL UNITED NATIONS

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Dear Delegates,

Welcome to the 2018 National Model United Nations Galápagos Conference (NMUN•Galápagos)! We are pleased to introduce you to our committee, the United Nations Environment Assembly (UNEA). This year's staff are: Director Cristian Toledo and Assistant Director Grace Naomi Ayala. Cristian obtained a BA in international relations from the Universidad San Francisco de Quito in 2016 and an MA in political and corporate communications from the University of Navarre in 2017. He previously interned with the Ecuadorean Embassy in Washington, DC. Naomi is currently studying international relations and anthropology at the Universidad San Francisco de Quito, and she has attended NMUN•New York for the past two years. She is a former member of the Corporation of Academic Simulations at her university, and she is currently interning within the Department of International Trade at the British Embassy in Ecuador.

The topics under discussion for UNEA are:

1. Management and Reduction of Waste in Urban Areas
2. Development of Eco-friendly Technology for the Protection of Oceans and Seas

UNEA is an example of evolution in the structure and priorities of the United Nations system. UNEA was created at the United Nations Conference on Sustainable Development (Rio+20) in 2012 to act as the "parliament of the environment." In this capacity, UNEA exemplifies a structural transition to accommodate universal membership and a heightened importance for environmental issues in international affairs. UNEA offers an inclusive forum for all stakeholders to discuss environmental policy. It is critical for delegates to understand the mandate of UNEA as a normative body that creates and promotes international environmental policy.

This Background Guide serves as an introduction to the topics for this committee. However, it is not intended to replace individual research. We encourage you to explore your Member State's policies in depth and to use the Annotated Bibliography and Bibliography to further your knowledge on these topics. In preparation for the Conference, each delegation will submit a Position Paper by 11:59 p.m. (Eastern) on 1 December 2017 in accordance with the guidelines in the *NMUN Position Paper Guide*.

On the NMUN website, you will find two resources that are essential to your preparation for the Conference and as a reference during committee sessions.

1. *NMUN Delegate Preparation Guide*: This document explains each step in the delegate process, from pre-Conference research to the committee debate and resolution drafting processes. Please take note of the information on plagiarism and the prohibition on prewritten working papers and resolutions. Delegates should not start discussion on the topics with other members of their committee until the first committee session.
2. *NMUN Rules of Procedure*: This document includes the long and short form of the rules, as well as an explanatory narrative and example script of the flow of procedure in committee.

In addition, please review the mandatory NMUN Conduct Expectations on the NMUN website. They include the Conference dress code and other expectations of all attendees. We want to emphasize that any instances of sexual harassment or discrimination based on race, gender, sexual orientation, national origin, religion, age, or disability will not be tolerated.

If you have any questions concerning your preparation for the committee or the Conference itself, please contact info@nmun.org.

We wish you all the best in your preparations and look forward to seeing you at the Conference!

Cristian Toledo, Director
Grace Naomi Ayala, Assistant Director

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Committee Overview

Introduction

The United Nations (UN) Environment Programme (UNEP) is the "leading global environment authority" in promoting environmentally friendly practices and policies in the UN system.[1] It is a program and fund of the UN that ensures international, regional, and local coordination for environmental issues, and it also ensures that various other UN entities take environmental impacts into account when executing their missions.[2] UNEP reports to the General Assembly and the Economic and Social Council (ECOSOC).[3]

> The **United Nations Environment Assembly** (UNEA) is the governing body of the **United Nations Environment Programme** (UNEP), which is a program and fund of the United Nations that reports to the Economic and Social Council and the General Assembly.

UNEP was created at the recommendation of the 1972 UN Conference on Human Environment in Stockholm, Sweden.[4] Six months later, the General Assembly adopted resolution 2997 (XXVII) of 1972 on "Institutional and financial arrangements for international environmental cooperation," which established UNEP as the official body concerned with environmental issues within the UN.[5] In 1992, the mandate of UNEP was broadened at the UN Conference on Environment and Development (UNCED) by the adoption of the conference's two outcome documents, *Agenda 21* and the *Rio Declaration on Environment and Development*.[6] Chapter 38 of *Agenda 21* calls for the creation of an inter-agency task force to research the best ways to identify and address environmental issues.[7] This led to the creation of the Inter-Agency Committee on Sustainable Development (IACSD), of which UNEP is a key member.[8]

Originally, UNEP was led by a Governing Council of only 58 members.[9] In 2012, at the UN Conference on Sustainable Development (Rio+20), Member States decided to strengthen UNEP, including by establishing universal membership in the Governing Council, to better execute the mandate of UNEP and place environmental issues in the same standing as health, security, and poverty.[10] Subsequently, the General Assembly adopted resolutions 67/213 (2012) and 67/251 (2013), which formally opened the Governing Council to all UN Member States and changed its designation to the United Nations Environment Assembly (UNEA).[11]

UNEA has held two universal sessions since its creation.[12] The first session of UNEA was held in June 2014 and a total of 17 resolutions and two decisions were adopted.[13] The resolutions covered a wide range of topics, from marine plastic debris to environmental sustainability in the context of sustainable development and poverty eradication.[14] The second session of UNEA (UNEA-2) was held in May 2016 and focused on the environmental dimensions of the Sustainable Development Goals (SDGs).[15] The third session of UNEA (UNEA-3) will be held in

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[1] UNEP, *About UN Environment*.
[2] Ibid.
[3] UN DPI, *The United Nations System*, 2017.
[4] UNEP, *Declaration of the United Nations Conference on the Human Environment*, 1972.
[5] UN General Assembly, *Institutional and financial arrangements for international environmental co-operation (A/RES/2997(XXVII))*, 1972.
[6] UN DESA, *United Nations Conference on Environment and Development (UNCED), Earth Summit*.
[7] UNCED, *Agenda 21*, 1992.
[8] UN System Chief Executives Board for Coordination, *IACSD*.
[9] UNEP, *United Nations Environment Programme Upgraded to Universal Membership Following Rio+20 Summit*, 2012.
[10] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012, p. 18.
[11] UN General Assembly, *Report of the Governing Council of United Nations Environment Programme on its twelfth special session and the implementation of section IV.C, entitled "Environmental pillar in the context of sustainable development", of the outcome document of the United Nations Conference on Sustainable Development (A/RES/67/213)*, 2012; UN General Assembly, *Change of the designation of the Governing Council of the United Nations Environment Programme (A/RES/67/251)*, 2013.
[12] UNEP, *UN Environment Assembly*, 2017.
[13] UNEP, *Resolutions and decisions adopted by the United Nations Environment Assembly of the United Nations Environment Programme at its first session on 27 June 2014*, 2014.
[14] Ibid.
[15] UNEP, *The path towards UNEA 2*.

December 2017; the theme of UNEA-3 will be "Toward a Pollution-free Planet" and the overarching aim of this session is to deliver a political declaration on ending pollution in the air, sea, and land.[16]

Governance, Structure, and Membership

UNEP's structure includes UNEA, the Secretariat, the Environment Fund, and the Committee of Permanent Representatives. As the main governing body of UNEP, UNEA, comprised of all Member States, meets biennially to set the global environmental agenda and to discuss emerging challenges.[17] UNEA makes major strategic decisions for UNEP, provides political guidance for state and regional programs, and promotes science-based environmental policies.[18] The UNEP Secretariat is responsible for supporting UNEA and consists of a rotating President, three Vice-Presidents, and a Rapporteur.[19] The Environment Fund is UNEP's main source of funding.[20] Member States' financial contributions to the fund are based upon the Voluntary Indicative Scale of Contributions, which means Member States are not required to provide funding to UNEP, though they are highly encouraged to donate.[21] UNEP's Committee of Permanent Representatives, which comprises all Permanent Representatives to UNEP, "prepares the meetings of [UNEA] and regularly reviews the implementation of its decisions."[22]

UNEP has six regional offices throughout the world that undertake UNEP's projects on regional, sub-regional, and local levels.[23] Each office holds yearly Regional Consultation Meetings where representatives from various civil society organizations (CSOs) are invited to engage in an environmental policy dialogue.[24] The regional offices bring any concerns or ideas from these meetings to the next UNEA meeting for wider UNEP discussion and possible implementation.[25] The role of the regional offices was increased and enhanced to include the Regional Consultation Meetings and other projects in 2003, when the Governing Council approved decision 22/14 on the role of UNEP in strengthening regional activities.[26] This decision called for UNEP's regional offices to strengthen their partnerships with other UN agencies in their region, create financial institutions to fund environmental causes, and establish or enhance partnerships with relevant local groups to strengthen UNEP's mission in each region.[27]

Mandate, Functions, and Powers

As set out in General Assembly resolution 2997 (XXVII) of 1972 on "Institutional and financial arrangements for international environmental cooperation," UNEP is mandated to promote international and regional environmental cooperation; help in establishing environmental policy; highlight global and regional problems; facilitate the transfer of scientific knowledge; assist developing Member States in environmental matters; review reports of the Executive Director; and approve the annual program on the allocation of UNEP's main source of funding, the Environment Fund.[28]

Upon the adoption of the *Nairobi Declaration* at the 19th session of the UNEP Governing Council in 1997, UNEP realigned its core mandate to ensure a more modern and technological approach to environmental issues.[29] The new core mandate made UNEP responsible for using the best available scientific methods and evidence to analyze global environmental trends; utilizing early warning systems; furthering the development of international environmental law and policy; monitoring and fostering Member State compliance with existing international environmental

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[16] UNEP, *A Political Declaration on Pollution*, 2017.
[17] UNEP, *About the UN Environment Assembly*, 2017.
[18] Ibid.
[19] UN General Assembly, *Change of the designation of the Governing Council of the United Nations Environment Programme (A/67/784)*, 2013.
[20] UNEP, *Funding for UN Environment*.
[21] Ibid.
[22] UNEP, *Committee of Permanent Representatives*.
[23] UNEP, *Major Groups and Stakeholders In The Regions*.
[24] Ibid.
[25] Ibid.
[26] UNEP, *Report of the twenty-second session of the Governing Council/Global Ministerial Environment Forum*, 2003, pp. 61-62.
[27] Ibid, p. 9.
[28] UN General Assembly, *Institutional and financial arrangements for international environmental co-operation (A/RES/2997(XXVII))*, 1972.
[29] UNEP, *1997 - Nairobi Declaration redefines and strengthens UNEP's role and mandate*.

norms; strengthening its role in coordinating UN environmental activities; serving as a link between the scientific community and the UN; and providing key policy advice for UN bodies, governments, and other institutions.[30] In 2002, the *Johannesburg Declaration on Sustainable Development* called upon UNEP and its partners to cooperate more closely across sustainable development initiatives for the implementation of *Agenda 21*.[31]

With the creation of UNEA and its universal membership in 2012, the mandate of UNEP has become more centered on the creation and promotion of environmental policy worldwide.[32] UNEP promotes international cooperation on existing environmental policies, guides the creation of new environmental policies, and uses environmental awareness to help Member States and CSOs respond to environmental threats.[33] To help achieve its mandate, UNEP has the ability to create task forces and subsidiaries to implement environmental policies.[34] However, the General Assembly or ECOSOC must approve any resolutions adopted by UNEP on environmental policy or creating new bodies.[35]

Recent Sessions and Current Priorities

UNEP currently operates under seven thematic priorities: climate change, disasters and conflicts, ecosystem management, environmental governance, chemicals and waste, resource efficiency, and environment under review.[36] A focus of these priorities is to decrease carbon emissions globally and promote the use of sustainable technologies in order to improve and maintain the state of the world's environment.[37] These seven thematic priorities expire at the conclusion of the *Medium Term Strategy 2014-2017* and have been renewed with minor alterations for the *Medium Term Strategy 2018-2021*.[38] Under the *Medium Term Strategy 2018-2021*, "disasters and conflicts" will become "resilience to disasters and conflicts," "ecosystem management" will become "healthy and productive ecosystems," and "chemicals and waste" will become "chemicals, waste and air quality."[39] These seven areas were chosen because they represent the most pressing and emerging issues, allowing UNEP to operate flexibly at international, regional, and state levels.[40]

The adoption of the SDGs has permanently altered how the international community will approach sustainable development; the *Medium Term Strategy 2018-2021* is a primary example of this.[41] Rather than focus on decreasing global carbon emissions as a component of climate change response, UNEA has directed UNEP to focus on climate change in relation to all three pillars of sustainable development.[42] By 2050, global demands for food are expected to increase by over 60% and global demands for water are expected to increase by over 55%.[43] In response to increasing resource demands and changing demographics, the *Medium Term Strategy 2018-2021* focuses on improving utilization of natural resources that influence the social and economic dimensions of sustainable development.[44] UNEP also recognizes the crucial importance of implementing the *Paris Agreement* to address climate change.[45] As the *Medium Term Strategy 2018-2021* has not yet come into action, performance measurements and indicators for how UNEA will hold Member States accountable under the *Paris Agreement* have not been fully developed.[46] However, during UNEA-2, the Assembly discussed various administrative and substantive issues that encompass the goal of the *Medium Term Strategy 2018-2021* and how various targets will be measured.[47]

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[30] New Zealand, *United Nations Handbook 2016-17*, 2016.
[31] World Summit on Sustainable Development, *Report of the World Summit on Sustainable Development (A/CONF.199/20)*, 2002.
[32] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012, p. 18.
[33] UNEP, *About the UN Environment Assembly*, 2017.
[34] UN System Chief Executive Board of Coordination, *United Nations Environment Programme*.
[35] Ibid.; UNEP, *About the UN Environment Assembly*, 2017.
[36] UNEP, *Medium Term Strategy 2014-2017*, 2015, p. 1.
[37] Ibid.
[38] Ibid., p. 18.
[39] Ibid.
[40] UNEP, *Policy Statement by Achim Steiner, UN Under-Secretary-General and UNEP Executive Director*, 2014.
[41] UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.
[42] UNEP, *Medium Term Strategy 2018-2021*, 2016, pp. 3-4.
[43] Ibid., p. 3.
[44] Ibid., pp. 2-4.
[45] Ibid., p. 4.
[46] Ibid., p. 54.
[47] UNEP, *Resolutions and Documents for the Second Session of the UN Environment Assembly*.

UNEA-2 was held from 23 to 27 May 2016 in Nairobi, Kenya, with the theme "Delivering on the Environmental Dimension of the *2030 Agenda for Sustainable Development*."[48] The Assembly adopted 25 resolutions on topics ranging from administrative amendments and rules of procedure to substantive decisions on biodiversity and engaging with the 2030 Agenda.[49] In order to enhance the participation of private sector and civil society stakeholders in UNEA-2, an online policy forum was used for disseminating information and holding discussions on various topics of interest.[50] All adopted resolutions relate to one or more of the seven thematic priorities of UNEP and prepare for the implementation of the *Medium Term Strategy 2018-2021*.[51]

UNEA-3 is scheduled to take place from 4 to 6 December 2017 "under the overarching theme of pollution."[52] In addition to resolutions and decisions, the outcomes of UNEA-3 will include the adoption of a political declaration on pollution that will set out "realistic steps to address pollution" for the benefit of human health, sustainable development, and the environment.[53] The President of the Assembly, Dr. Edgar Gutiérrez-Espeleta of Costa Rica, is leading ongoing consultations on a draft declaration that is currently in circulation amongst Member States and other stakeholders.[54] An advance copy of the report *Towards a Pollution-Free Planet*, prepared by the Executive Director of UNEP to support UNEA-3, has also been provided to Member States and other stakeholders for their review and input; the final report will be available in September.[55]

Conclusion

UNEP is the UN's official program concerned with the environment. Its expertise and knowledge is crucial for the implementation of a variety of established programs within the UN and Member States' governments. The creation of UNEA further accelerates UNEP's mission to ensure that the work of all UN entities, Member States, and CSOs is environmentally sustainable and in line with international laws and norms concerning the environment. The creation of an environmental entity with universal membership that oversees the world's environmental policy agenda reflects the growing importance of environmental issues and allows for a broader environmental agenda to be discussed and implemented.[56]

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> Agenda 21 *is one of the outcome documents of UNCED in 1992 and is a comprehensive plan that involved the UN system, governments, and other levels of government to in partnership to meet the challenges of environment and development. This outcome document reinforced UNEP as the global environmental platform and created the Commission on Sustainable Development to monitor its implementation. To fully understand the mandate of the UNEP and the scope of it work, delegates shall become familiar with* Agenda 21 *due to its being the first reaffirmation and expansion of the global environment agenda*.

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[48] UNEP, *The path towards UNEA 2*.
[49] UNEP, *Resolutions and Documents for the Second Session of the UN Environment Assembly*.
[50] UNEP, *The path towards UNEA 2*.
[51] UNEP, *Resolutions and Documents for the Second Session of the UN Environment Assembly*.
[52] UNEP, *UN Environment Assembly*, 2017.
[53] UNEP, *A Political Declaration on Pollution*, 2017.
[54] Ibid.; UNEP, *Draft Outline Document for the Ministerial Outcome Document of the 2017 UN Environment Assembly "Towards a Pollution-Free Planet"*, 2017; UNEP, *Member States and Stakeholders inputs to the Ministerial Declaration*, 2017.
[55] UNEP, *Towards a Pollution-Free Planet: Report of the Executive Director, United Nations Environment Programme*, 2017.
[56] UN General Assembly, *Report of the Governing Council of the United Nations Environment Programme on its twelfth special session and the implementation of section IV.C, entitled "Environmental pillar in the context of sustainable development", of the outcome document of the United Nations Conference on Sustainable Development (A/RES/67/213)*, 2012, p. 3.

United Nations Environment Programme. (n.d.). *Resolutions and Documents for the Second Session of the UN Environment Assembly* [Website]. Retrieved 31 July 2017 from: http://www.unep.org/about/cpr/documents/resolutions-and-documents-second-session-un-environment-assembly

>*This website is critical for delegates to understand what took place at the second session of the UNEA. It includes links to all of the resolutions adopted and official working documents that include the provisional agenda and reports from various entities on thematic issues. These documents provide delegates with an understanding of the scope of issues UNEP addresses, as well as changes to the rules of procedure unique to UNEA as the governing body of UNEP.*

United Nations Environment Programme. (2016). *Medium Term Strategy 2018-2021*. Retrieved 30 July 2017 from: https://wedocs.unep.org/rest/bitstreams/11369/retrieve

>*This is the next medium-term strategy for UNEP, which will take effect in 2018 when the current medium term strategy expires. This document is of particular importance for the delegates as it takes into consideration the* 2030 Agenda for Sustainable Development *while continuing to emphasize the seven priority areas. The document briefly outlines what has been achieved pursuant to the current medium-term strategy and uses a variety of statistics to illustrate the upcoming work and ongoing priorities of UNEP for the next several years.*

United Nations Environment Programme. (2017). *About the UN Environment Assembly* [Website]. Retrieved 29 August 2017 from: http://www.unep.org/environmentassembly/about-un-environment-assembly

>*This website provides a basic understanding of UNEA and its role within UNEP, including its structure, mandate, and why it is important to the UN system. It is a critical location for delegates to begin their research as it provides brief summaries on the functions, recent and past sessions, and thematic issues of UNEA, while also providing links to detailed resolutions and reports on various topics. This website should help delegates to easily distinguish between UNEP and UNEA and understand how they are connected to each other.*

United Nations Environment Programme. (2017). *Towards a Pollution-Free Planet: Report of the Executive Director, United Nations Environment Programme*. Retrieved 9 July 2017 from: http://wedocs.unep.org/bitstream/handle/20.500.11822/21213/Towards_a_pollution_free_planet_advance%20version.pdf?sequence=2&isAllowed=y

>*This report is published by UNEP in support of UNEA-3, which will convene in December 2017. As its theme implies, the meetings of UNEA-3 will discuss the environmental impacts of pollution on the planet, and the public and private sectors have a role to play in pollution management and reduction. The economic and health toll of pollution can also create adverse secondary effects, such as mass migration or malnutrition due to an inhospitable climate. It will be important to think ahead to UNEA-3 and seek solutions that are holistic and productive towards meeting the SDGs.*

United Nations, General Assembly, Sixty-sixth session. (2012). *The Future We Want (A/RES/66/288)* [Outcome Document]. Retrieved 31 July 2017 from: http://undocs.org/A/RES/66/288

>*This is the outcome document of Rio+20 that called for the strengthening of UNEP, including through the establishment of universal membership for the Governing Council. Through this document, the international community signaled that it was ready to prioritize the environment alongside issues such as peace, security, and health. Delegates should familiarize themselves with the commitments made by Member States at Rio+20 and consider how the expanded membership has contributed to a truly universal environment agenda.*

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I. Management and Reduction of Waste in Urban Areas

"Sustainable development is the pathway to the future we want for all. It offers a framework to generate economic growth, achieve social justice, exercise environmental stewardship and strengthen governance."[57]

Introduction

The protection of the environment represents one of the biggest concerns for the United Nations (UN).[58] To achieve the global environmental agenda and sustainable development, international cooperation is required.[59] Cities are essential stakeholders in efforts to protect the environment due to the impact of their large populations: in 2016, approximately 54.5% of the world's population lived in cities, and this figure is expected to rise to 60% by 2030.[60] The role and responsibilities of cities with respect to the protection of the environment have been discussed at several UN conferences.[61] The 1992 UN Conference on Environment and Development (UNCED) resulted in *Agenda 21*, which affirmed that cities need to be aligned to the global environment agenda due to the high amount of resources used in urban areas.[62] At the UN Conference on Sustainable Development in 2012, Member States adopted *The Future We Want*, which included important statements on urban areas and how they affect the environment.[63] The *2030 Agenda for Sustainable Development* (2015), adopted at the UN Sustainable Development Summit, describes cities as spaces of action for sustainable development, and the third UN Conference on Housing and Sustainable Urban Development (2016) focused on cities as "drivers of sustainable development" and critical actors in generating and achieving sustainable practices.[64]

For cities, effective waste management and reduction constitute significant challenges to ensuring sustainable urban development that is compatible with environmental protection.[65] Cities are crucial to waste management and reduction efforts as they are centers of production of a variety of waste, which can be defined as "materials that are not prime products (that is, products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose."[66] Waste is generally divided into two broad categories – hazardous and non-hazardous – depending on the treatment and attention that is required.[67] Improperly managed waste can cause economic, social, and environmental damages.[68] For example, unsustainable production and consumption processes cause economic and social damages as "natural resources are being consumed to the point of exhaustion, generating impacts on a planetary scale, imposing huge impacts on human health and the environment and creating massive social disruption."[69] These social and environmental damages are even more severe "for those living near disposal sites."[70] Practices such as dumping and uncontrolled open burning of hazardous wastes are "common" and "even increasing in some parts of the world," leading to higher chances of negative impacts on human health.[71]

As waste management is one of its most important priorities, the UN Environment Programme (UNEP) has taken several actions to address this theme.[72] These actions involve partnerships, conventions, treaties, plans, and provision of technical assistance.[73] Cities are essential to the initiatives planned to foster adequate waste management practices; accordingly, local authorities and civil society are working to analyze demands and address

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[57] UN Secretary-General, *Secretary-General's remarks at a G20 working dinner on "Sustainable Development for All"*, 2013.
[58] UNEP, *Overview*.
[59] UNCED, *Agenda 21*, 1992.
[60] Ibid.; UN General Assembly, *New Urban Agenda (A/71/256)*, 2016; UN DESA, *The World's Cities in 2016*, 2016.
[61] UNEP, *Overview*.
[62] UNCED, *Agenda 21*, 1992.
[63] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012.
[64] UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015; UN General Assembly, *New Urban Agenda (A/71/256)*, 2016; UN DESA, *Habitat III*.
[65] Vilella, Zero Waste Cities: At the Forefront of the Sustainable Development Goals Agenda, *The World Post*, 2016.
[66] OECD, *Waste*, 2003; UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 17.
[67] Ibid., p. 15.
[68] Ibid., p. 8.
[69] Ibid., p. 12.
[70] Ibid., p. 8.
[71] UNEP, *Global Environment Outlook (GEO-5)*, 2012, p. 170.
[72] UNEP, *Background*.
[73] UNEP, *Background*.

issues concerning waste.[74] Through multilateral effort, urban areas can become properly equipped with the tools to manage waste and to promote sustainable use of resources.[75]

International and Regional Framework

The international community has documented its pledge to achieve sustainable development in numerous framework documents that refer to the effects of urban areas on the environment and stress the responsibilities generated around them regarding the management and reduction of waste.[76] The commitment of Member States to the protection of the environment is clearly stated in *Agenda 21* (1992), which highlights that the well-being of humanity relies on the conservation of the environment.[77] *Agenda 21* also remarks that "integration of environment with development concerns and greater attention to them will lead to the fulfilment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future."[78] This can be achieved only through a joint effort of Member States: "a global partnership for sustainable development" that can be fulfilled by a conscious approach to environment and development issues.[79] In this vein, urban areas have started to be a crucial part of the international debate on the grounds of sustainable development and the protection of the environment.[80] *Agenda 21* points out that this is because cities have a large impact on the environment due to the amount of resources that they use to meet economic and social needs.[81] Environmental impact is even more significant in developing cities as they consume more resources to reach a developed status.[82] *Agenda 21* also includes several chapters on the management of different types of wastes, including toxic chemicals, hazardous wastes, solid wastes, and radioactive wastes.[83] It further highlights that the sustainability of urban settlements can be achieved through the adoption of practices such as waste management.[84]

Member States further confirmed their commitment to the protection of the environment in *The Future We Want*, which was adopted at Rio+20 in 2012.[85] *The Future We Want* states that sustainable development possesses three dimensions, "economic, social and environmental," and all of them must be achieved.[86] *The Future We Want* also observes that cities are crucial to the achievement of sustainable development as they will contain over "9 billion people by 2050."[87] Given this fact, the partnerships built between cities constitute a core tool to foster sustainable development; cities should thus join efforts in order to overcome the challenges posed by waste.[88] Member States voiced their commitment to building sustainable cities and urban settlements, as well as their support for "the sustainable management of waste through the application of the 3Rs (reduce, reuse and recycle)."[89]

Through the 2030 Agenda and the Sustainable Development Goals (SDGs), which succeeded the Millennium Development Goals that expired at the end of 2015, Member States renewed their commitment to the protection of the environment and the fulfillment of sustainable development.[90] SDG 11 establishes the ambition of "making cities and human settlements inclusive, safe, resilient and sustainable."[91] Target 6 of Goal 11 commits the international community to reducing, by 2030, "the adverse per capita environmental impact of cities, including by paying special

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[74] UNEP, *Chemicals and Waste*; Kosovar Civil Society Foundation, *Calls for proposals on waste management.*
[75] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013.
[76] UNCED, *Agenda 21*, 1992; UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012; UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015; UN General Assembly, *New Urban Agenda (A/71/256)*, 2016.
[77] UNCED, *Agenda 21*, 1992.
[78] Ibid.
[79] Ibid.
[80] Ibid.
[81] Ibid.
[82] Ibid.
[83] Ibid., chs. 19-22.
[84] Ibid.
[85] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012.
[86] Ibid.
[87] Ibid.
[88] Ibid.
[89] Ibid., p. 26.
[90] UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.
[91] Ibid.

attention to air quality and municipal and other waste management."[92] Waste management represents a core step for the cities to reach sustainability.[93] One of the indicators associated with target 11.6 guides urban areas to evaluate their waste management based on "the proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated."[94]

Adopted at the third UN Conference on Housing and Sustainable Development (Habitat III), and later endorsed by the General Assembly, the *New Urban Agenda* (2016) recognizes the relevance of the urban areas in the implementation of environmental sustainability.[95] This document gathers commitments from representatives of Member States and other stakeholders to achieve a shared vision of "cities for all," or "just, safe, healthy, accessible, affordable, resilient and sustainable cities and human settlements [that will] foster prosperity and quality of life for all."[96] The *New Urban Agenda* includes a commitment "to promoting environmentally sound waste management and to substantially reducing waste generation by reducing, reusing and recycling waste, minimizing landfills and converting waste to energy when waste cannot be recycled or when this choice delivers the best environmental outcome."[97] Additional commitments include fostering the development of adequate infrastructure for the management of waste in urban areas, as well as promoting "universal access to sustainable waste management systems" through "decentralized decision-making."[98]

Other important international frameworks relate specifically to waste management, control, and disposal.[99] The *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal* (1989) is an important agreement on hazardous waste management that aims to "reduce hazardous waste generation and promote environmentally sound management of hazardous wastes, wherever the place of disposal," and to restrict and regulate the movement of these type of wastes.[100] In 1998, the *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade* was adopted at a Conference of Plenipotentiaries.[101] This convention recognizes that "trade and environmental policies should be mutually supportive with a view to achieving sustainable development."[102] The *Stockholm Convention on Persistent Organic Pollutants*, adopted in 2001, focuses on restricting production and ensuring safe disposal of certain toxic organic compounds that resist degradation, accumulate in ecosystems, and cause harm to human health and the environment.[103] The Basel, Rotterdam, and Stockholm Conventions share a joint secretariat that is hosted by UNEP.[104]

Role of the International System

Since its creation in 1972, UNEP has led efforts to achieve the global environmental agenda in its role as the "environmental conscience of the UN system."[105] UNEP works to ensure the fulfillment of the environmental dimension of sustainable development and to protect the environment, including through promoting effective waste management and reduction.[106] UNEP manages the International Environment Technology Centre, "which works with governments around the world to help them reduce waste and manage it effectively"; UNEP also has a leading role in the Global Partnership on Waste Management, which focuses on raising awareness, fostering international

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[92] UN DESA, *Sustainable Development Goal 11*.
[93] Ibid.
[94] Ibid.
[95] UN General Assembly, *New Urban Agenda (A/71/256)*, 2016.
[96] Ibid.
[97] Ibid., p. 14.
[98] Ibid.
[99] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012, p. 18.
[100] *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, 1989.
[101] *Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade*, 1998.
[102] Ibid., p. 8.
[103] *Stockholm Convention on Persistent Organic Pollutants*, 2001.
[104] UNEP, *Dimensions of Pollution: Waste*, 2017.
[105] UNEP, *Background*; UNEP, *Overview*.
[106] UNEP, *Overview*.

cooperation, and capacity-building.[107] UNEA is the main governing body of UNEP and it therefore guides UNEP's work.[108] In December 2017, the third session of UNEA will focus on pollution, of which one dimension is waste.[109]

UNEP created the Subprogramme on Chemicals and Waste in order to support countries in the management of waste.[110] In order to accomplish its aims, the subprogramme receives the support of the Global Environment Facility (GEF), which is a coalition of "governments, industries, and civil society organizations."[111] The subprogramme and GEF are guided by the target set at the World Summit on Sustainable Development (WSSD), which is to reduce the hazards and negative outcomes of waste against human well-being and the conservation of the environment by 2020.[112] Guided by this target, governments, private sector, and civil society organizations (CSOs) are trained to respond to waste-related issues.[113] Through its Chemicals and Waste Branch, UNEP assists governments as they implement solutions to waste problems.[114] The work of the branch is focused on participating with governments on "clean production, use and disposal of chemicals" and on safe waste management practices.[115]

UNEP has established partnerships with programs, funds, and related organizations.[116] Some of the organizations actively working with UNEP are the UN Development Programme (UNDP), the UN Industrial Development Organization (UNIDO), the UN Institute for Training and Research (UNITAR), the International Labour Organization (ILO), the Food and Agriculture Organization of the UN (FAO), the World Health Organization (WHO), and the World Bank.[117] For example, UNITAR has collaborated with UNEP's International Environmental Technology Centre (IETC) to create the *Guidelines for National Waste Management Strategies: Moving from Challenges to Opportunities* (2013).[118] This set of strategies fulfil requests made of UNEP at Rio+20 and through *The Future We Want* to promote resource recovery, build national capacity, and develop adequate infrastructure for the management of waste.[119]

Aside from UNEP, other organizations undertake similar projects to address waste issues. UNITAR promotes waste-related policies through its Chemicals and Waste Management Programme (CWM).[120] It also provides training on sound management of waste and has ensured that "over 60 countries have participated in skills-building workshops for sound action plan development."[121] The efforts of UNDP, through its Chemicals and Waste Area, are designed to identify and eradicate unsustainable waste management procedures, as they deepen poverty and health risks.[122] UNDP also provides support to countries on waste management, waste prevention, and green economy projects.[123] Likewise, the FAO Food for the Cities initiative incorporates aspects of solid waste management in urban areas, such as composting and sewage treatment, that can contribute to sustainable agriculture.[124] The ILO has contributed to tackling waste related-challenges from a labor perspective, including through a 2013 investigation into decent work in waste management in Windhoek, Namibia.[125] In this investigation, the ILO works to identify the employment opportunities and benefits created around waste management.[126] ILO work is thus focused on encouraging decent work conditions and employment in waste management sectors.[127]

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[107] UNEP, *Dimensions of Pollution: Waste*, 2017.
[108] UNEP, *About the UN Environment Assembly*, 2017.
[109] UNEP, *Dimensions of Pollution: Waste*, 2017.
[110] UNEP, *Chemicals and Waste.*
[111] UNEP, *Scope of the Chemicals and Waste Subprogramme.*
[112] Ibid.
[113] Ibid.
[114] UNEP, *Chemicals and Waste*.
[115] Ibid.
[116] Ibid.
[117] Ibid.
[118] UNITAR, *Waste Management.*
[119] Ibid.
[120] UN Institute for Training and Research, *Chemicals and Waste Management.*
[121] Ibid.
[122] UNDP, *Chemicals and Waste Management.*
[123] Ibid.
[124] FAO, *Food for the Cities,* 2017.
[125] ILO, *Decent work in waste management*, 2013.
[126] Ibid., p. 5.
[127] Ibid., p. 5.

Some organizations outside the UN are also implementing actions to enhance the waste management sector.[128] The European Union (EU) is committed to achieving goals related to waste management and reduction as established by the European Commission.[129] Similarly, the Organisation for Economic Co-operation and Development (OECD) has created the *Guidance Manual on Environmentally Sound Management of Waste* (2007), which "aims at facilitating the implementation of an environmentally sound waste management policy" by both governments and waste treatment facilities.[130]

CSOs have played an important role in promoting efficient waste management and reduction.[131] CSOs are crucial to bring solutions to waste issues as they represent the requests of citizens and local needs.[132] As an example, the Kosovar Civil Society Foundation is one of the CSOs focused on waste management.[133] This CSO raises awareness of the need to protect the environment, calling for citizens and institutions to present projects to improve waste management in Kosovo.[134]

Principles of Waste Management

As set out in the *Guidelines for National Waste Management Strategies: Moving from Challenges to Opportunities*, UNEP and UNITAR identify three major principles of waste management: "waste hierarchy, life-cycle of products and the concept of waste as a resource."[135] These principles constitute the foundation for effective waste management strategy development.[136]

The waste management hierarchy describes a group of actions that can be used for waste management and reduction.[137] From most to least preferred, the actions are:

1. Prevention: "that the range, composition and design of products be changed in order to reduce waste through reduced resource demand and/or improved quality, i.e. improved manageability or reduced use of hazardous materials."[138]
2. Reduction: to minimize "the production of waste at society and individual level."[139] This "helps conserve resources for future generations and contributes to a cleaner environment."[140]
3. Recycling: "processing and use of wastes in production and consumption processes, for example, melting of scrap iron so that it can be converted into new iron products."[141]
4. Recovery: "any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy."[142]
5. Disposal: "waste elimination techniques comprising landfills, containment, underground disposal, dumping at sea and all other disposal methods."[143] It is considered the last mechanism to manage waste as it is a "last resort for waste which has not been able to be prevented, diverted, or recovered in the preceding steps."[144]

The waste management hierarchy reflects the end stages of the path of any given material or product.[145] However, the life cycle of a material or product begins with design, manufacture, distribution, and use, before then proceeding

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[128] European Environment Agency, *Municipal waste management across European countries,* 2017.
[129] Ibid.
[130] OECD, *Guidance Manual on Environmentally Sound Management of Waste,* 2007.
[131] UNDP, *Community-based Chemicals and Waste Management: Experiences from the GEF Small Grants Programme*, 2017.
[132] Ibid.
[133] Kosovar Civil Society Foundation, *Profile*, 2014.
[134] Kosovar Civil Society Foundation, *Calls for proposals on waste management.*
[135] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 19.
[136] Ibid.
[137] Ibid., p. 18.
[138] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 48.
[139] Waste Management Resources, *Waste Minimization*, 2009.
[140] California Department of Resources Recycling and Recovery, *Waste Reduction*, 2017.
[141] OECD, *Recycling*, 2005.
[142] Eurostat, *Recovery (excluding energy recovery).*
[143] OECD, *Disposal of Waste*, 2001.
[144] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 18.
[145] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 19.

to the waste management hierarchy.[146] Understanding the life cycles of materials and products is important to the design of effective waste management and reduction policies as each stage of the life cycle presents an opportunity for action: "to rethink the need for the product, to redesign it, to minimize its waste potential, to modify or extend its use so as to reduce its waste potential and to recover the resources embodied in it."[147] Ideally, waste management and reduction strategies should therefore consider the entire life cycle, beginning with waste minimization, "including through eco-efficient product design."[148]

Finally, the principle of addressing waste as a resource looks beyond improving waste management to actual reduction of waste.[149] The goal of waste management and reduction strategies must be to "optimize the use of the world's limited material resources by avoiding the generation of waste and, where waste is nevertheless generated, by treating waste as a resource waiting to be recovered and used."[150] As stated in *Agenda 21*, "environmentally sound waste management must go beyond the mere safe disposal or recovery of wastes that are generated and seek to address the root cause of the problem by attempting to change unsustainable patterns of production and consumption."[151]

Challenges and Benefits of Managing and Reducing Waste

Proper waste management and reduction require adequate resources and can therefore prove challenging for cities to implement.[152] Cities tend to generate a wide range of diverse types of waste, each with specific requirements for safe processing and disposal.[153] Economic resources are needed to build infrastructure, train personnel, and ensure compliance in the workplace.[154] Often, "50% of a city's budget is spent on waste management."[155] Coordination among different actors can be difficult to achieve: effective waste management requires all levels of government and other stakeholders to be involved in order to execute an overarching plan that prioritizes environmental protection.[156] As urbanization continues, cities must handle the prospect of increased waste generation associated with population growth.[157] Economic growth and "increased affluence" also tend to contribute to higher levels of waste generation per person in cities.[158] Challenges are more significant for cities in developing countries, which frequently lack "waste management infrastructure and awareness," leading to unsustainable methods of production and consumption.[159] Further, developing countries are subject to the movement of hazardous wastes across borders from developed countries, which look to take advantage of locations "where compliance, monitoring and enforcement of regulations tend to be weak, and the financial and technical capacity to implement improved waste management practices is limited."[160]

In spite of the relevant costs and challenges, proper waste management and reduction result in profits and benefits to governments and local authorities.[161] For example, implementing adequate waste management practices, such as reutilization of materials, can prevent unnecessary economic spending on new materials.[162] Likewise, local authorities can benefit from understanding waste as a resource, rather than an element to be discarded.[163] Proper

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[146] Ibid.
[147] Ibid.
[148] UN Commission on Sustainable Development, *Policy options and actions for expediting progress in implementation: waste management – Report of the Secretary-General (E/CN.17/2011/6)*, 2011, p. 3.
[149] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 19.
[150] Ibid.
[151] UNCED, *Agenda 21*, 1992, para. 21.4.
[152] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 12.
[153] UNEP, *Global Environment Outlook (GEO-5)*, 2012, p. 175.
[154] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 30.
[155] Ibid., p. 8.
[156] Ibid., p. 30.
[157] Ibid.
[158] UNEP, *Global Environment Outlook (GEO-5)*, 2012, p. 175.
[159] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 12; UNDP, *Community-based Chemicals and Waste Management: Experiences from the GEF Small Grants Programme*, 2017, p. 2.
[160] UNEP, *Global Environment Outlook (GEO-5)*, 2012, p. 170.
[161] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 12.
[162] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 12.
[163] Ibid.

waste management can result in economic, social, and environmental benefits for urban areas.[164] An economic benefit can be recognized when waste management activities can lead to improve production and consumption in an efficient a sustainable way.[165] Another economic benefit from waste management comes when the sector creates business and employment opportunities.[166] Some social benefits are reduction of poverty and improvement of human health.[167] The environmental benefits are the protection of the environment through the reduction of pollution.[168]

The Importance of Information and Reporting

According to the UN Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development, "data are the lifeblood of decision-making and the raw material for accountability. Without high-quality data providing the right information on the right things at the right time, designing, monitoring and evaluating effective policies becomes almost impossible."[169] Similarly, *The Future We Want* states that information is crucial for achieving sustainable development.[170] The *2030 Agenda for Sustainable Development* recognizes the power of information as a mechanism to promote "human progress" and "knowledge societies."[171] Therefore, in this context, information is crucial for raising awareness around waste, for understanding why waste must be managed properly and reduced where possible, and for providing the foundation for effective strategies and policies to support waste management and reduction.[172]

For example, to foster commitment to and investment in waste management and reduction, it is important for cities and other stakeholders to understand the true impact of waste and the enormity of the challenge that it presents for sustainable development.[173] According to UNEP, "every year, an estimated 1.3 billion tonnes of solid waste is collected worldwide. This figure is expected to increase to 2.2 billion tonnes by 2025, with almost all of the increase from developing countries."[174] Another figure brought to view that "decay of the organic fraction of solid waste contributes about 5% of global greenhouse gases."[175] Likewise, "globally, about one-third of food produced for human consumption is lost or wasted, amounting to about 1.3 billion tonnes per year."[176] Proper data collection and reporting can also help to identify opportunities related to waste management.[177] For example, "the global waste market, from collection to recycling, is estimated at US$410 billion a year, not including the sizable informal segment in developing countries."[178] Another fact points out the profits that can be gained from waste management: "one tonne of electrical and electronic waste (e-waste) contains as much gold as 5-15 tonnes of typical gold ore, and amounts of copper, aluminum and rare metals that exceed by many times the levels found in typical ores."[179]

Information is a crucial element for organizing strategies and plans of action directed to manage waste.[180] In recognition of the importance of information, the knowledge platform Know Waste was developed by the Global Partnership on Waste Management to help "identify and fill information gaps, share information, and strengthen awareness, political will, and capacity to promote resource conservation and resource efficiency."[181] Know Waste specifically "aims to promote, share and exchange information on solid waste-related issues."[182] A similar effort was the development of the *Global Waste Management Outlook* (2015) by UNEP's International Environmental

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[164] Ibid.
[165] Ibid.
[166] Ibid.
[167] Ibid.
[168] Ibid.
[169] UN Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development, *A World that Counts - Mobilising the Data Revolution for Sustainable Development*, 2014, p. 2.
[170] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012.
[171] UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.
[172] UNEP, *Global Environment Outlook (GEO-5)*, 2012, p. 168.
[173] Ibid.
[174] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 19.
[175] Ibid., p. 13.
[176] Ibid.
[177] Ibid.
[178] Ibid.
[179] Ibid.
[180] Ibid., p. 14.
[181] UNEP, *Global Partnership on Waste Management.*
[182] Ibid.

Technology Centre (IETC) and the International Solid Waste Association (ISWA).[183] The *Global Waste Management Outlook* is a comprehensive report that provides "an authoritative overview, analysis and recommendations for action of policy instruments and financing models for waste management."[184] It points out that one of the components of the good governance of a city is having a "sound solid waste management (SWM)," which can be achieved by "instituting management information systems."[185]

Unfortunately, misunderstandings, misconceptions, and lack of information have contributed to the failure of cities to manage and reduce waste properly and effectively.[186] In 2011, the UN Secretary-General reported to the Commission on Sustainable Development that barriers to waste management and reduction "include lack of data, information, and knowledge on waste scenarios."[187] Given the importance of waste-related data, it is important to address underlying problems that affect its reliability.[188] These problems include lack of standard definitions, absence of measurement, and lack of standard reporting systems.[189] Adequate reporting is also crucial to enhance services and reduce damages.[190] Underreporting causes difficulties in addressing critical issues.[191] Therefore, it is ideal, for example, for the "media [to] fairly report on the statistical and scientific evidence available on relevant dimensions of sustainable development and foster an evidence-based public discourse using advanced visualization technologies to better communicate key data to people."[192]

Education plays an important role in waste management, particularly as "certain audiences are particularly susceptible to educational programs or delivery of targeted information."[193] According to the *Guidelines for National Waste Management*, "Educating children early and building an awareness of the importance of managing waste properly at an individual and family level, then reinforcing that message throughout the course of schooling, will yield returns over many years contributing to responsible waste behavior."[194] For example, one factor that encourages unsustainable waste management practices is an ongoing conception that waste has no value.[195] Education, alongside public awareness campaigns, could contribute to reversing this conception by demonstrating how waste management and reduction can save costs and enhance efficiency.[196] UNEP has stressed its commitment to environmental education via its Environmental Education and Training (EET) activities, which have the aim to "promote attitudes and value systems that influence environmentally ethical behavior by developing understanding, skills and values that will enable people participate as active and informed citizens in the development of an ecologically sustainable and socially just society."[197]

Enhancing the Role of Civil Society

Civil society is crucial to achieving sustainable development: as noted in *Agenda 21*, to enhance global cooperation for the protection of the environment, it is necessary that governments implement integral and inclusive policies that facilitate the "broadest public participation and the active involvement of the non-governmental organizations and other groups."[198] *The Future We Want* also identifies civil society as a core actor in the fulfillment of the three dimensions of sustainable development.[199]

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[183] UNEP, *Global Waste Management Outlook*, 2015.
[184] Ibid.
[185] Ibid., p. 8.
[186] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 13.
[187] UN Commission on Sustainable Development, *Policy options and actions for expediting progress in implementation: waste management – Report of the Secretary-General (E/CN.17/2011/6)*, 2011, p. 3.
[188] UNEP, *Global Waste Management Outlook*, 2015, p. 32.
[189] Ibid.
[190] UN Secretary-General's Independent Expert Advisory Group on a Data Revolution for Sustainable Development, *A World that Counts - Mobilising the Data Revolution for Sustainable Development,* 2014, p. 9.
[191] Ibid., p. 14.
[192] Ibid., p. 19.
[193] UNEP & UNITAR, *Guidelines for National Waste Management Strategies*, 2013, p. 62.
[194] Ibid.
[195] UN Commission on Sustainable Development, *Policy options and actions for expediting progress in implementation: waste management – Report of the Secretary-General (E/CN.17/2011/6)*, 2011, p. 10.
[196] Ibid., p. 11.
[197] UNEP, *About Environmental Education and Training.*
[198] UNCED, *Agenda 21*, 1992.
[199] UN General Assembly, *The Future We Want (A/RES/66/288),* 2012.

Civil society is playing an important role in waste management.[200] For example, CSOs are working with UN agencies and state actors "to prevent food waste through awareness raising campaigns, regulatory interventions, community action events and exchanges of ideas and experiences around the world."[201] CSOs are of particular assistance in large cities, where local authorities may not have the capacity to handle waste management independently.[202] Local non-governmental organizations and community-based organizations (CBOs) have proven particularly effective in actual implementation of effective waste management and reduction strategies in urban areas.[203] One example is in Kampala, Uganda, where "domestic local NGOs and CBOs are involved in physical operations such as waste recycling, drainage cleaning and waste collection, especially in poorer neighbourhoods."[204] Another example is the success associated with the Global Environment Facility Small Grants Programme, administered by UNDP, in providing funding and technical support to community-based projects that support waste management.[205] These diverse projects range from improving medical waste management in Nepal to engaging youth in urban waste management in Macedonia.[206]

However, there are numerous barriers that hamper the full participation and effectiveness of NGOs and CBOs, including "a lack of resources, donor dependency, central policies that favour large private companies and a lack of government recognition, as well as their lack of trust and confidence in partnerships or collaboration."[207] Additionally, active support, expansion, and scaling-up are required to ensure that local initiatives are able to generate results beyond the limited area of their communities.[208]

Conclusion

The international community has committed to protecting the environment through sustainable initiatives, as shown through numerous agreements and conventions. The environmental dimension of sustainable development is the base of UNEP's efforts to execute practices and plans to protect the environment, including through effective waste management and reduction.[209] Cities are crucial to sustainable development: the 2030 Agenda notes that the management and sustainable development of urban areas are essential to assure good quality of life to the people.[210] Cities therefore have the responsibility to implement processes of waste management and to promote responsible, sustainable consumption that prevent the generation of waste where possible.[211] While there has been some progress in waste minimization, all stakeholders "need to achieve much greater progress if there is to be any possibility of realizing the ultimate objective of 'zero waste' economies and societies."[212]

Further Research

Waste management and reduction have been established as important responsibilities for cities.[213] What are the barriers to effective waste management and reduction in cities, and how can UNEP address these barriers? How can the contribution of civil society to waste management and reduction be enhanced? Which other means can be applied to raise awareness about the dangers of mismanagement of waste? How can UNEP ensure the participation of local governments to reduce the production of waste? Which partnerships can UNEP build to promote waste management and reduction? What types of incentives could contribute to mobilizing private sector initiatives?

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[200] UNEP, *Global Waste Management Outlook,* 2015, p. 115.
[201] Ibid.
[202] Ibid., p. 174.
[203] UNDP, *Community-based Chemicals and Waste Management: Experiences from the GEF Small Grants Programme*, 2017.
[204] UNEP, *Global Waste Management Outlook*, 2015, p. 175.
[205] UNDP, *Community-based Chemicals and Waste Management: Experiences from the GEF Small Grants Programme*, 2017.
[206] Ibid.
[207] UNEP, *Global Waste Management Outlook*, 2015, p. 175.
[208] UNDP, *Community-based Chemicals and Waste Management: Experiences from the GEF Small Grants Programme*, 2017.
[209] UNEP, *Scope of Chemicals and Waste Subprogramme*.
[210] UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.
[211] Ibid.; UN General Assembly, *New Urban Agenda (A/71/256)*, 2016.
[212] UN Commission on Sustainable Development, *Policy options and actions for expediting progress in implementation: waste management – Report of the Secretary-General (E/CN.17/2011/6)*, 2011, p. 4.
[213] UN General Assembly, *New Urban Agenda (A/71/256),* 2016.

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>   *This article describes the challenges and difficulties that waste brings to urban areas. The authors use New York, Hong Kong, and Beijing as case studies to determine the evolution of the management and reduction of waste. These three cities are examined in relation to factors such as the history of waste management, sustainability, recycling, food waste, and further challenges. The article uses data, graphics, and tables to simplify the compiled information. The article is a brief view of the way in which urban areas deal with waste, and it helpfully illustrates the various problems and challenges associated with waste management.*

European Environment Agency. (2016). *Waste, recycling* [Website]. Retrieved 6 June 2017 from: https://www.eea.europa.eu/data-and-maps/indicators/waste-recycling-1/assessment
>   *This work of the European Environment Agency provides substantial data on the actions taken to manage waste in Europe. The article provides clear graphics and figures that are easy to interpret. The article also presents the main targets that should be fulfilled for the European Union members on the issue. It will be useful for delegates to compare how different countries apply waste management practices. Also provided is a list of important policy documents related with waste management.*

United Nations Environment Programme & United Nations Institute for Training and Research. (2013). *Guidelines for National Waste Management Strategies: Moving from Challenges to Opportunities*. Retrieved 5 June 2017 from: http://cwm.unitar.org/national-profiles/publications/cw/wm/UNEP_UNITAR_NWMS_English.pdf
>   *UNEP and UNITAR collaborated to produce these guidelines to assist in the formation of national waste management strategies. The document presents a comprehensive overview of the main concepts and principles related to waste, including waste management and its reduction. Other topics include the responsibilities and duties of different stakeholders, as well as the strategies, challenges, and benefits associated with the management and reduction of waste. The document explains waste-related concepts in a clear way. It will be useful for delegates in understanding the importance of waste and its relation with sustainable development.*

United Nations Statistics Division. (2016). *UNSD Environmental Indicators, Waste* [Website]. Retrieved 6 June 2017 from: https://unstats.un.org/unsd/environment/Time%20series.htm#Waste
>   *This UN Statistics Division group of documents collects the main environmental indicators related to waste. These documents register information of the generation, collection, recycling, and treatment of waste in urban areas. Each document provides wide data that can serve as a tool to understand the compromise of local governments to manage and reduce waste. The website present official data that can be used to understand national contexts.*

World Urban Campaign. (2016). *The City We Need*. Retrieved 3 June 2017 from: http://www.worldurbancampaign.org/sites/default/files/documents/tcwn2en.pdf
>   *This document of the World Urban Campaign outlines some of the requirements that cities need to implement to improve. The article presents 10 principles that any city should present in order to become a better space of living. In this work, the term "drivers of change" is used to label and address factors such as governance, finance, education, and technology that are meant to influence the development of the cities. This resource was important to the development of the* New Urban Agenda. *With this document, it is easy to understand the role of cities to achieve sustainable development.*

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II. Development of Eco-friendly Technology for the Protection of Oceans and Seas

"Oceans provide food, energy, water, jobs and economic benefits for people in every country – even those that are landlocked. They are a crucial buffer against climate change and a massive resource for sustainable development. The health of our oceans and seas is inextricably linked with the health of our planet and all life on earth. ... The truth is, the sea has a special relationship with all of us. It keeps us alive. But that relationship is now under threat as never before."[214]

Introduction

Oceans and seas "drive global systems that make the Earth habitable for humankind."[215] Covering three quarters of the Earth's surface, oceans and seas are essential to sustainable development, poverty eradication, food security, and trade and transportation.[216] Over three billion people depend directly on marine biodiversity for their livelihoods.[217] As they supply oxygen and absorb carbon dioxide, oceans and seas are essential to mitigating the effects of climate change.[218] Accordingly, the issue of preservation of our oceans and seas has achieved great prominence on the international community's agenda, particularly after the adoption of the Sustainable Development Goals (SDGs), as SDG 14 is specifically on conservation and sustainable use of the oceans, seas, and marine resources.[219] Organizations within the United Nations (UN) system, including the UN Environment Programme (UNEP), have therefore launched initiatives and projects designed to protect the oceans and seas, including by encouraging the development of technologies that will help with the protection and conversation of the oceans and seas.[220] As defined in *Agenda 21* (1992), eco-friendly or "environmentally sound" technologies "protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes."[221] *Agenda 21* further acknowledges that the availability, access, and transfer of technology "are essential requirements for sustainable development."[222] Advances in eco-friendly technology will be especially crucial for international efforts to protect the oceans and seas, which are subject to greater threats than ever before from both marine- and land-based human activities.[223]

International and Regional Framework

The protection and preservation of marine environments is acknowledged in the *United Nations Convention on the Law of the Sea* (UNCLOS) (1982), which has been ratified by 168 States Parties.[224] Article 192 expressly establishes that "states have the obligation to protect and preserve the marine environment."[225] UNCLOS can therefore be considered as one of the first international attempts to develop a control mechanism to protect and conserve oceans and seas.[226] UNCLOS also addresses the development and transfer of marine technology.[227] Article 266 provides that "states, directly or through competent international organizations, shall cooperate in accordance with their capabilities to promote actively the development and transfer of marine science and marine technology on fair and reasonable terms and conditions."[228]

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[214] UN Secretary-General, *Secretary-General's opening remarks to the Ocean Conference [as delivered]*, 2017.
[215] UNDP, *Goal 14: Life below Water*, 2017.
[216] UN Ocean Conference, *Our ocean, our future: call for action (A/CONF.230/11)*, 2017, p. 2.
[217] UNDP, *Goal 14: Life below Water*, 2017.
[218] UN Ocean Conference, *Our ocean, our future: call for action (A/CONF.230/11)*, 2017, p. 2.
[219] Ibid.
[220] UNEA, *Oceans and seas (2/10)*, 2016; UNEA, *Marine plastic litter and microplastics (2/11)*, 2016; UNEA, *Delivering on the 2030 Agenda for Sustainable Development (2/5)*, 2016.
[221] UNCED, *Agenda 21*, 1992, para. 34.1.
[222] Ibid., para. 34.7.
[223] UN General Assembly, *Preparatory process of the United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development: Note by the Secretary-General (A/71/733)*, 2017, p. 2.
[224] *United Nations Convention on the Law of the Sea*, 1982.
[225] Ibid., art. 192.
[226] UN Division for Ocean Affairs and the Law of the Sea, *The United Nations Convention on the Law of the Sea: A historical perspective*, 1998.
[227] *United Nations Convention on the Law of the Sea*, 1982, part XIV.
[228] Ibid., art. 266.

The international community reaffirmed its commitment to the protection and preservation of oceans and seas through *Agenda 21*, which was adopted at the UN Conference on Environment and Development in 1992.[229] *Agenda 21* is a plan of action to which Member States committed to guide their activities towards sustainable development.[230] Chapter 17 of *Agenda 21* stresses the importance of the oceans and seas to sustainable development, as well as human dependence on oceans and seas: over half of the world's population lives in coastal areas.[231] *Agenda 21* also highlights the "need for favourable access to and transfer of environmentally sound technologies, in particular to developing countries, through supportive measures that promote technology cooperation and that should enable transfer of necessary technological know-how as well as building up of economic, technical, and managerial capabilities for the efficient use and further development of transferred technology."[232] At the UN Conference on Sustainable Development in 2012, Member States adopted *The Future We Want*, in which they reiterated their commitment to oceans and marine ecosystems, while also emphasizing "the need for cooperation in marine scientific research" and for "the transfer of technology" to assist developing countries.[233]

Other international agreements point to the significance of the oceans and seas, as well as to the importance of technology for their protection. The *Convention on Biological Diversity* (1992) aims to protect all biological diversity, or biodiversity, defined as the "variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part."[234] It acknowledges that technology is essential to the protection of biodiversity, and it contains provisions on access to and transfer of technology (art. 16), exchange of information (art. 17), and technical and scientific cooperation (art. 18).[235] Article 25 of the Convention establishes the Subsidiary Body on Scientific, Technical and Technological Advice to assist States Parties with implementation.[236] The *United Nations Framework Convention on Climate Change* (UNFCCC) (1992) contains a commitment by States Parties to promote sustainable management, conservation, and enhancement of "sinks and reservoirs of all greenhouse gases," including oceans, thus recognizing the important role that oceans and seas have in mitigating climate change.[237] The *Paris Agreement*, adopted by the Conference of the Parties to the UNFCCC in 2015, reaffirms the need to protect oceans specifically and underlines "the importance of fully realizing technology development" to support efforts against climate change.[238]

In September 2015, the UN General Assembly adopted the *2030 Agenda for Sustainable Development*, which includes the 17 SDGs and 169 targets.[239] SDG 14 is to "conserve and sustainably use the oceans, seas and marine resources for sustainable development"; target 14.a is to "increase scientific knowledge, develop research capacity and transfer marine technology … in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries."[240] SDG 17, which addresses implementation and the global partnership for sustainable development, includes targets on enhancing "regional and international cooperation on and access to science, technology and innovation" and on promoting the "development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms."[241]

Role of the International System

Ever since its creation, UNEP has served as a global leader in environmental protection and conservation, including with respect to the oceans and seas.[242] One of the oldest and most effective initiatives from UNEP regarding the conservation of oceans and seas is the Regional Seas Programme (RSP).[243] Launched in 1974, the RSP aims to

[229] UNCED, *Agenda 21*, 1992.
[230] Ibid.
[231] Ibid, ch. 17.
[232] Ibid., para. 34.4.
[233] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012, pp. 30-31.
[234] *Convention on Biological Diversity*, 1992, art. 2.
[235] Ibid., arts. 16-18.
[236] Ibid., art. 25.
[237] *United Nations Framework Convention on Climate Change*, 1992, art. 4.
[238] Conference of the Parties to the UNFCCC, *Paris Agreement*, 2015, Preamble, art. 10.
[239] UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.
[240] UN DESA, *Sustainable Development Goal 14*, 2017.
[241] UN DESA, *Sustainable Development Goal 17*, 2017.
[242] New Zealand, *United Nations Handbook 2016-2017*, 2016, pp. 260-61.
[243] UNEP, *Regional Seas Programme: Overview*.

address threats to the world's oceans and coastal areas through the ¨shared seas¨ approach.[244] This approach refers to plans of action and practices, supported by regional conventions, that are being collectively implemented by groups of countries in regions around the world.[245] Other relevant UNEP programs include the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities and the International Coral Reef Action Network.[246] UNEP participates in UN-Oceans, an inter-agency mechanism that coordinates UN system activities related to oceans and seas.[247] It also serves as co-coordinator of the Interagency Task Team on Science, Technology and Innovation for the SDGs, which forms part of the Technology Facilitation Mechanism that supports the implementation of the 2030 Agenda.[248]

As the governing body of UNEP, the UN Environment Assembly (UNEA) regularly addresses the oceans and seas at its sessions.[249] At its second session in 2016, UNEA adopted resolution 2/10 on "Oceans and seas," which calls for "continued cooperation and coordination on marine issues among all relevant global and regional forums and organizations" for the achievement of SDG 14, as well as encouraging UNEP "to provide scientific support" to enhance understanding of "abrupt, accelerating or irreversible environmental changes," including "thawing of the permafrost of the seabed and melting of sea ice and glaciers."[250] UNEA resolution 2/11 on "Marine plastic litter and microplastics" recognizes the role of "cost-effective technologies" and "automated and remote sensing technology" in efforts to reduce plastic debris in the marine environment.[251]

UNEP collaborates with the Intergovernmental Oceanographic Commission of the UN Educational, Scientific and Cultural Organization (IOC-UNESCO), which specializes in marine science.[252] In 2003, IOC-UNESCO adopted the *IOC Criteria and Guidelines on Transfer of Marine Technology* as a tool to assist States Parties with applying the provisions of UNCLOS related to the development and transfer of marine technology.[253] Other UN system entities and related organizations involved in addressing oceans and seas include the UN Development Programme (UNDP), which provides country-specific assistance in managing marine resources through the Water and Ocean Governance Programme; the Food and Agriculture Organization of the UN (FAO), which promotes sustainable use of marine resources; and the International Maritime Organization (IMO), a specialized agency of the UN in charge of maritime safety and prevention of pollution from ships.[254]

The UN Conference to Support the Implementation of Sustainable Development Goal 14, also known as the Ocean Conference, took place from 5-9 June 2017 at UN Headquarters in New York.[255] Throughout the conference, stakeholders discussed methods, techniques, and technologies that could lead humanity towards a sustainable usage of oceans and seas.[256] The conference included seven partnership dialogues, one of which was focused on "increasing scientific knowledge, and developing research capacity and transfer of marine technology" in line with SDG target 14.a; participants included representatives from Member States, intergovernmental organizations, and non-governmental organizations (NGOs).[257] The outcomes of the conference included a Call for Action, pursuant to which Member States committed "to act decisively and urgently" with the goal of "halting and reversing the decline in the health and productivity of our ocean and its ecosystems and to protecting and restoring its resilience and ecological integrity."[258] The Call for Action encouraged all stakeholders to take steps to implement SDG 14,

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[244] Ibid.

[245] Ibid.

[246] UN-Oceans, *About UN-Oceans*, 2017.

[247] UN-Oceans, *About UN-Oceans*, 2017.

[248] UNEP, *Technology and 2030 Agenda*.

[249] UNEP, *About the UN Environment Assembly*, 2017.

[250] UNEA, *Oceans and seas (2/10)*, 2016.

[251] UNEA, *Marine plastic litter and microplastics (2/11)*, 2016.

[252] UNESCO, *Intergovernmental Oceanographic Commission*, 2017.

[253] IOC-UNESCO, *IOC Criteria and Guidelines on the Transfer of Marine Technology*, 2005.

[254] UN-Oceans, *About UN-Oceans*, 2017.

[255] UN Environment Programme, *The Ocean Conference.*

[256] UN Environment Programme, *The Ocean Conference.*

[257] UN Ocean Conference, *Partnership dialogue 6: Increasing scientific knowledge, and developing research capacity and transfer of marine technology*, 2017.

[258] UN Ocean Conference, *Our ocean, our future: call for action (A/CONF.230/11)*, 2017, p. 2.

including by investing in marine scientific research, ocean and coastal observation, and scientific and technological innovation."[259]

As demonstrated by the diverse participants at the Ocean Conference, the protection of oceans and seas is the responsibility not only of Member States, but also of non-governmental actors. The participation of civil society and the private sector is essential to the protection of oceans and seas, as well as to sustainable development overall.[260] Examples include the work of the International Union for Conservation of Nature (IUCN), which includes both government and civil society organizations, is "the world's largest and most diverse environmental network."[261] IUCN maintains a Global Marine and Polar Programme focused on protecting marine and polar ecosystems, promoting sustainable use of marine and polar resources, and building an international framework to conserve marine biodiversity.[262] In December 2016, following a "keystone dialogue" between scientists and business representatives, eight of the world's largest seafood companies decided to create the Seafood Business for Ocean Stewardship initiative.[263] The companies intend to fulfil commitments to responsible ocean stewardship, including eliminating certain fishing practices that jeopardize endangered species, engaging in science-based efforts to improve aquaculture, and investing in emerging approaches and technologies that support sustainable fisheries and aquaculture.[264] Clean Seas, a UNEP-led campaign inaugurated in February 2017, aims to eliminate plastic debris in oceans and seas through a partnership between national governments; the private sector, especially companies that produce plastic litter; and civil society.[265]

The Role of Technology in Protecting the Oceans and Seas

Oceans, seas, and marine resources are in jeopardy as a result of impacts from human activities.[266] Climate change has proven particularly harmful: as oceans and seas absorb carbon dioxide, adverse consequences have included rising ocean temperatures, "ocean and coastal acidification, deoxygenation, sea-level rise, the decrease in polar ice coverage, coastal erosion and extreme weather events."[267] The declining health of oceans and seas is alarmingly visible in coral reefs, which are highly diverse ecosystems that are particularly vulnerable to changes in the environment.[268] Many coral reefs have been subject to bleaching: as ocean temperatures and acidification increase, corals expel a type of algae on which they rely for energy and lose their bright colors in the process.[269] If ocean conditions prevent the algae from returning, the corals eventually die.[270] Other significant threats include marine pollution; marine litter; the introduction of non-native species; destructive fishing practices; overfishing; and illegal, unreported, and unregulated fishing.[271]

The multitude of threats evinces the need for innovative approaches to protecting oceans and seas; correspondingly, there is a wide variety of technology that may have useful applications.[272] The *IOC Criteria and Guidelines on the Transfer of Marine Technology* notes that "marine technology refers to instruments, equipment, vessels, processes and methodologies required to produce and use knowledge to improve the study and understanding of the nature and resources of the ocean and coastal areas," including:

    a)   Information and data, in a user-friendly format, on marine sciences and related marine operations and services;
    b)   Manuals, guidelines, criteria, standards, references materials;

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[259] Ibid., p. 4.
[260] UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.
[261] IUCN, *About*, 2017.
[262] IUCN, *About the IUCN Global Marine and Polar Programme*, 2017.
[263] *"Keystone dialogue" creates breakthrough in ocean stewardship*, Marine Stewardship Council, 2016.
[264] Seafood Business for Ocean Stewardship, *Joint Statement from the 1st Keystone Dialogue*, 2016.
[265] UNEP, *UN Declares War on Ocean Plastic*, 2017.
[266] UN Ocean Conference, *Our ocean, our future: call for action (A/CONF.230/11)*, 2017, p. 2.
[267] Ibid.
[268] UN General Assembly, *The Future We Want (A/RES/66/288)*, 2012, p. 34.
[269] UNEP, *Urgent Need for Sustainable Management of Coral Reefs*.
[270] Ibid.
[271] UN General Assembly, *Preparatory process of the United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development: Note by the Secretary-General (A/71/733)*, 2017, pp. 2-3.
[272] IOC-UNESCO, *IOC Criteria and Guidelines on the Transfer of Marine Technology*, 2005, p. 9.

c) Sampling and methodology equipment (e.g. for water, geological, biological, chemical samples);

d) Observation facilities and equipment (e.g. remote sensing equipment, buoys, tide gauges, shipboard and other means of ocean observation);

e) Equipment for in situ and laboratory observations, analysis and experimentation;

f) Computer and computer software, including models and modeling techniques; and

g) Expertise, knowledge, skills, technical/scientific/legal know-how and analytical methods related to marine scientific research and observation.[273]

Technology development therefore presents countless possibilities for furthering marine conservation, and in recent years, innovative breakthroughs in marine technology have resulted in new ways to protect oceans and seas.[274] For example, advances in "satellite-interfacing sensors and data processing tools" are providing, for the first time, accurate information on ongoing activities in the world's oceans and seas, thereby facilitating monitoring that could contribute to enforcement of international treaties and safeguarding of marine protected areas.[275] Scientists and fishing companies are working together on high-tech nets that can target specific species of fish and cause less damage to sea beds.[276] Numerous projects are focusing on marine pollution, including new technology designed to extract plastic debris from oceans via "an array of solid floating barriers and platforms anchored to the seabed" and operating solely on the strength of ocean currents.[277]

Challenges and Opportunities for Technology Development

Knowledge and Data

To protect oceans and seas, "policymakers and resource managers need to know about all of the ways it is used by both people and marine life."[278] Accurate information is also required to ensure the development of technology that effectively addresses threats to oceans and seas.[279] However, "the ocean is still one of the least known areas of the world."[280] There are many gaps in knowledge and data about oceans and seas, especially with respect to "ecosystem processes and functions and their implications for ecosystem conservation and restoration, ecological limits, tipping points, socioecological resilience and ecosystem services," as well as the impacts on biodiversity and ocean productivity.[281] Knowledge and data that already exists is not always effectively disseminated: data systems are not always universally accessible, and data collection lacks standardization across regions.[282]

Capacity-building

Relative gaps in capacity exist between developed countries and developing countries, particularly small island developing countries (SIDS) and least-developed countries.[283] These gaps prevent developing countries from "taking advantage of what the ocean can offer them, as well as reduce their capability to address the factors that degrade the ocean."[284] Many international agreements stress the importance of providing assistance to developing countries with respect to technology, including by establishing favorable conditions for the transfer of technology; in the specific context of oceans and seas, UNCLOS mandates States Parties to "promote the development of the marine scientific

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[273] Ibid.

[274] Mulrennan, 8 Breakthrough Innovations Saving Our Ocean, *Ocean Views*, 2016.

[275] McCauley, *How Satellites and Big Data Can Help to Save the Oceans*, 2016.

[276] Gilpin, *4 technologies that will help save the oceans*, 2015.

[277] Nagappan, *5 Technologies That Are Helping Save the Oceans*, 2015.

[278] Tripp, Point 97: New Technology to Manage and Protect the Oceans, *Marine Science Today*, 2013.

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[280] UN Ocean Conference, *Partnership dialogue 6: Increasing scientific knowledge, and developing research capacity and transfer of marine technology*, 2017.

[281] UN General Assembly, *Preparatory process of the United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development: Note by the Secretary-General (A/71/733)*, 2017, p. 12.

[282] UN Ocean Conference, *Report of the UN Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development*, 2017, p. 50.

[283] UN General Assembly, *Preparatory process of the United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development: Note by the Secretary-General (A/71/733)*, 2017, p. 13.

[284] UN Ocean Conference, *Partnership dialogue 6: Increasing scientific knowledge, and developing research capacity and transfer of marine technology*, 2017, p. 7.

and technological capacity of states which may need and request technical assistance in this field, particularly developing states."[285] Approaches to capacity-building include provision of targeted technical support, strengthening institutional capacity for research and development, creating accessible training centers for human resource development, and enhancing coordination through both North-South and South-South cooperation.[286]

Partnerships

Although there are many partnerships focusing on technology related to oceans and seas, they may suffer from "limited effectiveness, lack of resources, fragmentation or duplication" and would benefit from review.[287] Some partnership opportunities have not been fully explored: in particular, many stakeholders anticipate a greater role for the private sector, including through "partnerships with marine industries, including shipping, fishing, energy and other sectors," which have access to data and platforms for further development of technology.[288] Youth and entrepreneurs have made significant contributions to technology development that could have an enormous impact if made accessible to a wider audience through, for example, "governance structures [that] could help promote the open exchange of knowledge and technology."[289] There is also potential for new partnerships between "UN organizations and universities and research institutes."[290] Enhancing stakeholder engagement is crucial for the formation of effective partnerships; possible approaches could involve focusing on "ocean education and literacy" to raise "awareness of the issues facing the oceans through knowledge and innovation hubs and institutes."[291]

Conclusion

Oceans and seas are crucial to "human well-being and livelihoods"; yet, they face threats so severe that "delays in implementing solutions to the problems that have already been identified will lead to incurring greater environmental, social and economic costs."[292] Recent advances in technology have created opportunities for the international community to protect the oceans and seas, as well as to reverse damage that has already been done, but more work is required to fully realize the potential of technology for sustainable development. Achieving SDG 14 will require stakeholders to work together to foster development of eco-friendly technology that could help ensure the protection and conservation of oceans and seas for the benefit of current and future generations.

Further Research

How can UNEA help to create an environment that encourages the development of eco-friendly technology? In what ways can technology and innovation support both new and existing initiatives and programs to protect the oceans and seas? What barriers exist to technology development and how can UNEA address them? How can UNEA contribute to building partnerships for technology development? How can the international community advance the implementation of UNCLOS provisions related to development and transfer of marine technology? How can data collection and research capacity be improved? How can UNEA foster greater engagement and investment from civil society and the private sector in technology development?

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[285] *United Nations Convention on the Law of the Sea*, 1982, art. 266.
[286] UNCED, *Agenda 21*, 1992, para. 34.14; UN Ocean Conference, *Partnership dialogue 6: Increasing scientific knowledge, and developing research capacity and transfer of marine technology*, 2017, p. 8.
[287] Ibid., p. 9.
[288] UN Ocean Conference, *Report of the UN Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development*, 2017, p. 49.
[289] Ibid., pp. 49-50.
[290] UN Ocean Conference, *Partnership dialogue 6: Increasing scientific knowledge, and developing research capacity and transfer of marine technology*, 2017, p. 10.
[291] Ibid., p. 50.
[292] UN General Assembly, *Preparatory process of the United Nations Conference to Support the Implementation of Sustainable Development Goal 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development: Note by the Secretary-General (A/71/733)*, 2017, p. 3.

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