1. Environmental policy: origin, science and knowledge in global and European contexts

Rapidly increasing anthropogenic global environmental change in the second half of the 20th century led to the emergence and global spread of environmental problems, but also to the development of environmental protection agendas at different scales, and raising of international and European environmental institutions and policies.

This chapter introduces landmark documents and global conferences that have set the course for environmental policy at the global and European levels, gives insights into policy of science and scientific politics, and provides an overview of basic concepts of environmental governance and institutions of environmental governance.

1.1. Global and European Environmental Policy — Milestones and Concepts

Anton Shkaruba, Vladislav Donchenko, Ruben Zondervan

The "great acceleration" (Steffen et al., 2015) in global environmental change, largely anthropogenic caused, led to the emergence and global spread of environmental problems in the second half of the 20th century. The entire earth system now operates well outside the normal state exhibited over the past 500,000 years (Steffen et al., 2004) and risks exceeding planetary boundaries (Rockstrom et al., 2009).

Alongside the acceleration in frequency, complexity, and magnitude of global environmental change, new research challenges, issues, methods, and even entirely new scientific disciplines emerged to address these challenges. In parallel, and complementary to numerous local, national, and regional environmental protection policies, the environment and the more encompassing issue of sustainable development became items on the agenda of global governance.

This chapter introduces a set of landmark reports, global policy processes and conferences that have set the course for environmental policy at the global level and influenced concepts now featur-

ing prominently in research and policy on the policy challenges of global environmental change.

1.1.1. Club of Rome — the Limits to Growth

The 1972 Report on Limits to Growth (Meadows et al., 1972) by the *Club of Rome* was an international bestseller and among first comprehensive studies on global environmental change. Using computer modeling of population, industrialization, pollution, food production and resources variables, and taking the assumption that these variables would grow exponentially, while assuming that the technology to increase availability or use-intensity of these resources would only grow linearly, the report pictured a bleak future.

The Limits to Growth Report by Donella Meadows, Dennis Meadows, Jørgen Randers and William W. Behrens III, presented on March 12, 1972 in the Smithsonian Institution (Washington DC) as the first report of the Club of Rome, was based on a mathematical model called WORLD3. This model build on previous work by Jay Forrester on WORLD1, and the next (refined) version WORLD2, published in a 1971 book titled *World Dynamics* (Forrester, 1971) which predicted major human-caused global environmental disaster by the 2020s.

The combination of a mathematical model to assess human impacts, tipping points and thresholds, was innovative for that time — and in hindsight quite accurate: comparison of model outputs with observed data for 1970–2000 show a close match for the *standard run* scenario of the report (though neither for the *comprehensive technology* scenario nor the *stabilized world* scenario) (Turner, 2008).

The Limits to Growth Report no doubt had a great impact not only on the academic community and policy-makers, but also on the general public. This, and subsequent further reports by the Club of Rome analyzed various aspects of global social and economic development, and formed the inspiration to and knowledge foundation of numerous international policies and initiatives (Meadows et al., 1972). It also provided momentum to emerging public discussions of and social movements around environmental problems and the future of the planet in the early 1970s. Eventually, environmental issues appeared in the international political discussions, and were taken up

by the United Nations for the first time in 1972 at the Stockholm Conference (see below).

It is worthy to note here, that some aspects of the report seemingly had a lasting impact on global environmental change research. For example, the dominance of "apocalyptic narratives", the heavy reliance on computer based modelling, or the generally sceptical or even pessimist view on technological innovations and solutions.

1.1.2. The 1972 UN Conference on the Human Environment

Global UN Conference on the environment are widely understood as a major institutional innovation of the 1970s (Haas, 2002: 78) and started with the *UN Conference of Human Environment*, 5–16 June 1972 in Stockholm, Sweden. Representatives of 113 countries (The Soviet Union and most of its allies did not participate), 19 inter-governmental agencies, and more than 400 inter-governmental and non-governmental organizations discussed and negotiated a joint approach to the issues of environment and development. It defined two main reasons for global environmental change: (1) fast population growth in developing countries, and (2) industrialization in developed countries.

The outcomes of the meeting were the Declaration of the United Nations Conference on the Human Environment (UNEP, 1972), containing 26 principles concerning the environment and development, as well as an Action Plan with 109 recommendations, and a Resolution. The Stockholm Declaration consists of two parts. The first part summarizes the state of human-nature interactions (very much following the conclusions of the reports to the Club of Rome) in seven introductory proclamations. In particular, it recognizes the importance of the state of the environment for human well-being and therefore declares environmental protection as the duty of all Governments. In this context, it confirms the obligation of industrialized countries to help developing countries to reduce the gap in human development — thereby laying the foundations for what later in international climate change policies would become the paramount principle of Common but Differentiated Responsibility (CBDR). The declaration also notes that population growth presents the biggest challenge to the environment, and all the means of technological and

research development should be used to reduce the human footprint and adapt to this growth; and finally it calls for inclusive and equitable policy-making and management actions. The second part of the Stockholm Declaration (UNEP, 1972) lists the 26 principles of human development and environmental protection (see Annex 1).

The Stockholm Action Plan included 109 recommendations focusing on (1) environmental assessment, (2) environmental management and (3) preventive measures. To address the objectives related to *environmental assessment*, the overall recommendation was to develop monitoring systems, so policies and decisions would be based on accurate and up-to-date information. The recommendations for achieving *environmental management* objectives related to the development of legislation and regulatory mechanisms, and the establishment of decision-making and management bodies. Development of *preventive measures* was seen as a revolutionary approach for replacing "end of pipe" solutions as the dominating paradigm of environmental protection at that time.

The 1972 Stockholm Conference gave rise to the development of national and international environmental programs, and to setting up the mechanisms and bodies for their implementation. Most significant, responding to the outcomes of the Stockholm Conference, the United Nations Environmental Program (UNEP) was established. The outcomes of the Stockholm Conference played a major role in raising environmental awareness, and not at least laid foundation to the international system of environmental protection with new institutions and negotiations of international environmental governance emerging and proliferating since then (Chasek & Wagner, 2012).

As another result of the Stockholm Conference, terms such as "international environmental relations", "environmental policy", "environmental legislations" not just emerged, but also started to gain importance in policy discussions at all levels, and became important fields of research. This generated an increasing demand for expertise related to environmental protection, and universities responded to it with opening new educational programs and updating the existing ones with new courses — and specialized sub-disciplines like international environmental governance (from international relations), environmental management (from public policy studies), and environmental economics (from macro-economics) developed. Even

new scientific disciplines like earth system sciences and sustainability sciences emerged.

Resulting from the conference, many countries adopted national policy documents on environmental protection, and citizen rights to a healthy environment became recognised, in many instances even as a constitutional right (Gellers, 2015). In most countries, such national policies for environmental protection were first developed as a part of the national government, often in a very top-down manner. Such governance systems were (and in many countries still are) based on a rigid legislative framework, compulsory standards and rules, and dedicated implementation agencies integrated to national administrative systems.

1.1.3. Brundtland Commission — Our Common Future

In 1983, the UN General Assembly set up the World Commission on Environment and Development (WCED). Gro Harlem Brundtland, former (1981–82) and then future (1986–89, 1990–96) Norwegian primeminister and former minister for environment, was appointed to chair the Commission which soon became known as the Brundtland Commission. Its objectives were (WCED, 1987):

- to re-examine the critical issues of environment and development and to formulate innovative, concrete, and realistic action proposals to deal with them;
- to strengthen international cooperation on environment and development and to assess and propose new forms of cooperation that can break out of existing patterns and influence policies and events in the direction of needed change; and
- to raise the level of understanding and commitment to action on the part of individuals, voluntary organizations, businesses, institutes, and governments.

The thematic areas analyzed by the Commission included population, food security, the loss of species and genetic resources, energy, industry, and human settlements, all those areas viewed as interconnected and interdependent system. After publishing the report *Our Common Future* in 1987 the Commission was dissolved.

Our Common Future gave very specific examples demonstrating the critical state of the global ecological system. It broadly used predictions from the reports to the Club of Rome and outcomes of the 1972 Stockholm Conference, and it discussed environmental issues as a part of the overall political agenda by combining them with the issue of *development*. The Report linked the objectives of environmental conservation to the development of human resources (poverty reduction, gender and social equality) as components of the single development agenda, and although it did not identify specific activities leading to environmental degradation, and did not discussed economic principles and mechanisms responsible for quantitative and qualitative characteristics of economic growth, the Report paved an avenue for such discussions. The report recognized that many global crises are interlocking crises constituting the single global crisis, and that any global solutions are only possible if the active involvement of all sectors of human society in decision-making is secured.

One of the best known features in the *Our Common Future* is the definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

The concept of sustainable development, as defined in *Our Common Future*, was somewhat contradictory to the central idea of the Stockholm Declaration, although it was very much based on the outcomes of the Stockholm Conference. While the main narrative of the Stockholm discussions was that future generations would be living in polluted and uncomfortable environment, destroyed by economic growth, industrialization, and population growth, the Brundtland Report warned that the economic growth itself could be compromised by environmental degradation. *Our Common Future* further stresses that the dependency of states on the environment and resources will be growing in post-industrial societies, and environment and economy will be increasingly interdependent at all the scales. The Report argues that successful implementation of the principles of sustainable development shall be based on strict enforcement of environmental norms and standards that need to be developed for specific economic activities.

Once the Report has been approved by the UN General Assembly, the term *sustainable development* became established and politically accepted and was quickly picked up by policy and aca-

demic communities all over the globe. *Our Common Future* wrapped up the epoch of industrialization with its increasingly important interdependence of states, and suggested the idea of sustainable development for the post-industrial society.

1.1.4. The 1992 UN Conference on Environment and Development

The United Nations Conference on Environment and Development (also known as the Earth Summit) was held in Rio de Janeiro, Brazil, 5–14 June 1992. The conference was unprecedented for its scale: 172 governments sent their representatives, including 116 sending their heads of state or government; over 2,400 participants were representing NGOs. Some 17,000 participants attended the parallel NGO "Global Forum".

From the beginning, the Conference was designed not only as a venue for intergovernmental negotiations, where politicians would listen to expert opinions and take decisions, but also as a public event of global importance that would unleash new energy in environmental governance, engaging actors beyond the state and across scales, from local to global, from communities to large transnational networks (Andonova & Hoffmann, 2012). An important element of the message was that nothing but behavioral change would be crucial to get on a sustainable development trajectory. To convey and translate this message, over 10,000 journalists were accredited.

Preparations for the Earth Summit started in December 1989. They included discussions, planning sessions and negotiations between the UN member states resulting in a conference that achieved the adoption of the landmark Agenda 21 (United Nations, 1992), a comprehensive plan for achieving global sustainable development. As often in intergovernmental negotiations, Agenda 21 was a compromise. However, it remained for long the most important internationally negotiated and agreed document outlining principles and methods of sustainable development. In addition to Agenda 21, the conference also agreed on the Rio Declaration on Environment and Development, and a Statement of Forest Principles, and started the process of negotiations leading to the three so called *Rio Conventions*:

- the United Nations Framework Convention on Climate Change (UNFCCC);
- the United Nations Convention on Biological Diversity (CBD);
- the United Nations Convention to Combat Desertification (UNCCD).

UN member states could not agree on a similar convention on forests, hence the adaptation of the non-binding statement of forest principles as a direct conference output. However, in outcome and impact, this failure to institutionalize global forest governance in an intergovernmental setting, provided a space for private agency to emerge in form of the Forest Stewardship Council (Pattberg, 2005), and also illustrated the emergence of an era in global sustainable development governance in which increasingly non-state actors gained agency in global sustainable development governance (Dellas, Pattberg, & Betsill, 2011).

Other "institutionalizations" resulting from the conference, mainly aiming at facilitating the follow-up mechanisms agreed, included:

- the Commission on Sustainable Development (CSD);
- the Inter-agency Committee on Sustainable Development;
- the High-level Advisory Board on Sustainable Development.

Agenda 21 is a 300 page-document with status of a non-binding, voluntarily implemented action plan. It served as a framework for the development of many national and local agendas, most of which also have a non-binding status. Agenda 21 consists of 40 chapters that have been aggregated into four sections:

- Section I: Social and Economic Dimensions is directed toward combating poverty, especially in developing countries, changing consumption patterns, promoting health, achieving a more sustainable population, and sustainable settlement in decision making.
- Section II: Conservation and Management of Resources for Development includes atmospheric protection, combating deforestation, protecting fragile environments, conservation

of biological diversity (biodiversity), control of pollution and the management of biotechnology, and radioactive wastes.

- Section III: Strengthening the Role of Major Groups includes the roles of children and youth, women, NGOs, local authorities, business and industry, and workers; and strengthening the role of indigenous peoples, their communities, and farmers.
- Section IV: Means of Implementation: implementation includes science, technology transfer, education, international institutions and financial mechanisms.

The Rio Declaration on Environment and Development (1992) is a not binding document consisting of 27 principles that define responsibilities and rings of states regarding the implementation of Agenda 21 (Annex 2).

The decade after the 1992 Rio Conference, saw a mushrooming of multilateral environmental agreements (MEAs) — depending on definition and source up to 800 — as an important new mechanism in global environmental policies (Kanie, 2007) but also as the cause of the high level of fragmentation which currently characterizes the institutional landscape in global sustainable development governance. The issue of fragmentation also gained strong academic interest (Biermann et al., 2009) which more recently is turning from problematizing this, to understanding how this fragmented landscape could orchestrate sustainable development, especially within the 2030 Development Agenda and the Sustainable Development Goals (see below) (Abbott & Bernstein, 2015).

1.1.5. Millennium Development Goals and the World Summit on Sustainable Development

The Millennium Development Goals (MDGs) were initiated at the United Nations Millennium Summit in 2000, based on the United Nations Millennium Declaration negotiated and adopted on that meeting. The Millennium Declaration started a five-year process that formulated and revised the MDGs into the 8 Goals and 21 Targets that formed the final structure (Annex 3).

The goal-focused structure of the MDGs, signifying that outcomes were prioritized over implementation strategies, was not new as

such — a few other goal-sets were already agreed upon in development policies — it was another innovation in global sustainable development policies. While such clear, time-bound, and quantified targets can provide clear benchmarks for policy makers, such results based management significantly leave implementation up to the other actors (Fukuda-Parr, 2008) — which aligns to the high level of fragmentation in sustainable development governance at the time of the conference. Content-wise, the MDGs did not really add new aspects on the global agenda but rather focused on encouraging adherence with existing international treaties (Fukuda-Parr & Greenstein, 2010).

While the MDGs are generally considered to having made a significant impact, it remains a question how much of the poverty reduction achieved in the period of the MDGs is the result from any implementation efforts that can be attributed to the MDGs. The no-MDG counterfactual condition (Hovi, Sprinz, & Underdal, 2003) may have seen similar progress. This is most clear in the case of poverty reduction in China where poverty reduction efforts were started before the MDGs and the MDGs had little impact on their actions and were responsible for three-quarters of the achievement.

Following the relative low-profile Millennium Conference, a next large UN conference on sustainable development was organized 26 August — 4 September 2002 in Johannesburg: *The World Summit on Sustainable Development*. The summit marked the 10th anniversary of the United Nations Conference on Environment and Development in Rio, and the 30th anniversary of the United Nations Conference on the Human Environment in Stockholm hence also became known as the "Rio+10 Summit".

The Summit had a mixed success: due to the absence of the United States (The George W. Bush government boycotted the Summit) its global legitimacy was somewhat compromised, and its discussions and outcomes also received less publicity than it was expected. Different from previous conferences, the intergovernmental outcomes were meager at best. The Johannesburg Declaration on Sustainable Development very much builds on the outcomes and follow-up experience of Stockholm (1972) and Rio (1992) conferences, and calls for further steps towards sustainable development. As such, the Declaration does not offer anything strikingly new in terms of concepts or methods for achieving sustainability, but it reaffirms the

global commitment, calls for broader involvements of stakeholder groups beyond national governments, and brings to the attention issues of human security. Nevertheless, the conference was an important milestone in the history of global environmental governance because of its *type 2* (as different from the intergovernmental *type 1* outcomes). This was the endorsement of "partnership initiatives" between different sectors and actors to support Millennium Development Goals. Despite partnerships being hyped as a mechanism to reduce the implementation and regulation gaps, extensive research in the years following the conference, paints a different picture: Many partnerships never became operational, hardly any had discernible activity, and only few any impact (Pattberg et al., 2012).

Another remarkable aspect of the 2002 Conference was that for the first time in the UN, the importance of good governance "*within each country and at the international level*" was brought forward. The Implementation Plan calls for the development of institutional framework for sustainable development to promote the implementation through good and globally coordinated governance. An issue that became a core agenda item ten years later in the Rio+20 Conference.

1.1.6. Rio+20 and the Sustainable Development Goals

The 2012 United Nations Conference on Sustainable Development, know better as Rio+20 Conference, was held in Rio de Janeiro in June 2012. The conference with two agenda items, the Institutional Framework for Sustainable Development, and the Green Economy, resulted in a political outcome document entitled "The Future we Want" (UN General Assembly, 2012) which contains measures for implementing sustainable development.

The Rio+20 Summit resulted in a policy outcome that, according to most observers, did neither meet the requirements for a deep transformation of the current unsustainable practices nor the high expectations of the public, media, NGOs and scientists (Pattberg & Mert, 2013). A potentially important outcome of the Rio+20 Conference is the strengthening of the United Nations Environment Programme (UNEP). The conference also saw the establishment of a new body in the already fragmented landscape on sus-

tainable development in the UN System, the High-Level Political Forum for Sustainable Development (HLPF).

The most important, if not even decisive result of the Rio+20 Conference, was the decision to launch a process to develop a set of Sustainable Development Goals (SDGs), which will build upon the Millennium Development Goals and converge with the Development Agenda for 2030. The terms and content of the SDGs were developed primarily in the outcome document of the Open Working Group on Sustainable Development Goals (SDGs) which was released in July 2014 (OWG, 2014). The OWG was an intergovernmental body in the UN, which met for over a year with inputs from scientists, civil society, and the private sector to develop a framework for the SDGs. Key issues about financing were handled in the Intergovernmental Committee of Experts on Sustainable Development Financing, which had a similar work program. Measurement and indicators discussions and the fit of the SDGs into the larger Post-2015 Development Agenda were major discussions for negotiations through 2015 with the goal to create a coherent structure for overall efforts. The OWG outcome document listed 17 separate goals and 169 targets and was agreed upon by the UN General Assembly in September 2015 (Annex 4).

The Sustainable Development Goals mark the most ambitious effort yet to place goal setting at the center of global governance and policy (Kanie & Biermann, 2017) and pose an enormous challenge to global sustainable development governance, but will require also tremendous efforts of the global research community in understanding governance through goals and providing the knowledge needed for a sustainable future.

1.1.7. From Incrementalism to Transformative Governance of Sustainable Development

The mega-conferences described in this chapter are important milestones in the development of international environmental governance, and have at times served as catalysts for new ideas and the generation of momentum behind certain environmental policy initiatives — from new global conventions like the UNFCCC to a mushrooming of local initiatives (see for comprehensive overview

(Chasek & Wagner, 2012). In addition, their near universal participation including substantial civil society involvement, have given them a lot of weight and legitimacy. However, students in this area should be cautious not to equal these conferences and their outcomes — often rather long bucket-lists of non-binding to-do's — with the overall dynamics and topics of international environmental governance or as reflecting the state-of-art in our knowledge about environmental change (Ely et al., 2013; Haas, 2002; Pattberg & Mert, 2013) but rather a lowest common denominator of political discourses and interests. Even some of the "success stories" like the establishment of so called Partnerships for Sustainable Development at the 2002 Johannesburg Conference, turned out to be more window dressing than actual progress (Mert, 2013). Most actual policies might be fostered by the momentum of the global conferences or inspired by their outcomes (for example the local Agenda 21 chapters, or focus of development policies along the MDGs), but are in essence developed, implemented and enforced on local, national and at best regional level (here mainly in the EU).

In conclusion, for the 21st century, when societies must now change course and steer away from critical tipping points in the Earth system that might lead to rapid and irreversible change, the incremental change enabled by the conferences and reports needs replacement by a transformative reorientation of national and international institutions toward more effective governance (Biermann et al., 2012).

1.1.8. Development and transition of the European system of environmental governance

The 1980s saw an exceptional number of man-made environmental disasters, including those associated with military conflicts. This brought forward the issues of environmental security, and stimulated interest in integrated approaches to environmental management. In the European Union this started with the Environmental Impact Assessment (EIA) Directive 85/337 EEC (in force since 1985).

The new perspective the Directive took on environmental responsibility was revolutionary for the time and greatly influenced environmental management and policy in the EU and beyond. The

new definition suggested that instead of responsibility for environmental pollution and associate damage alone, the responsibility would rather move to timely preventive measures. To pursue this objective, the Directive decrees that any activities with potential significant impact on the environment are subject to the procedure of environmental assessment. The Directive specifies what kinds of activities shall be submitted to this procedure, and describes the procedure itself. It also pays attention to availability and open circulation of environmental information, and to stakeholder consultations. The Directive 85/337 was taken as good practice by many countries outside the EU, especially in Europe, and used for modernisation of national environmental legislation and implementation mechanisms.

A few years before the adoption of the EIA Directive, Directorate-General for the Environment was set-up in 1981 to coordinate and develop the EU environmental policy. To provide data and information on the state of European Environment, the European Environment Agency (EEA) was established in 1990 with headquarters in Copenhagen (Denmark) by the EEC Regulation 1210/1990; it became operational in 1994. Responsibilities of the Agency included development of environmental standards and indicators, coordination and further development of environmental monitoring and observation (in particular through the European environment information and observation network (Eionet) established at EEA), and circulation of best practices in environmental management. Non-EU countries can join the EEA as well, and in addition to all the EU member states, the agency includes five non-EU member countries, and six further countries have the status of cooperating countries.

Since 1973, EU environmental policy was steered and coordinated through Action Programmes for the Environment. The first one was adopted after the Stockholm Conference and based on its outcomes; the second (1977), third (1983) and fourth (1987) Programmes reflected most important trends in the development of international environmental policy and the needs to support the rapidly growing body of EU environmental legislation. The fifth and the sixth Programs have been developed for 10-year periods (with optional reviews every five years). Under the Fifth Program (1992–2000), the Community actions have been limited to the following actions:

- long-term management of natural resources: soil, water, countryside and coasts;
- an integrated approach to combating pollution, and acting to prevent waste;
- reducing the consumption of energy from non-renewable sources;
- improving the management of mobility by developing efficient and clean modes of transport;
- drawing up a coherent package of measures to improve the quality of the urban environment;
- improving health and safety, in particular in relation to the management of industrial hazards, nuclear safety and radiation protection.

Actions, included to the Sixth Program (2002–2012) feature:

- publishing a communication on the importance of integrating the environment into land-use planning and management;
- improving the implementation of the Environmental Impact Assessment Directive;
- spreading best practice and fostering the exchange of experience on sustainable development, including urban development;
- including sustainable development in Community regional policy;
- boosting agri-environmental measures within the Common Agricultural Policy;
- developing a partnership for the sustainable management of tourism.

The Seventh Environment Action Program will be guiding EU environmental policies till 2020. It entered in force in 2014, and its key objectives are:

- to protect, conserve and enhance the European Union's natural capital;
- to turn the EU into a resource-efficient, green, and competitive low-carbon economy;
- to safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing.

To deliver the objectives, four "enablers" were formulated:

- better implementation of legislation;
- better information by improving the knowledge base;
- more and wiser investment for environment and climate policy;
- full integration of environmental requirements and considerations into other policies.

By 1997, when the Treaty of Amsterdam was signed, the key principles of environmental policy were recognized as central to the EU governance, and therefore they were included to the Treaty:

- Sustainable development;
- Prevention approach;
- Precautionary principle;
- Polluter pays principle;
- Principle of integration of environmental requirements in other Community policies;
- Subsidiary principle;
- Principle of high level of environmental protection.

Some of these principles already featured in the First Action Programme for the Environment (1973) and in the previous editions of the Treaty, such as the Single European Act and the Maastricht Treaty, however it was only in 1997 that all of them were brought together with the addition of the principle of sustainable development, which was also set as the overall approach for EU environmental policy.

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Annex 1: Stockholm 1972 Principles (UNEP, 1972)

Principle 1 — Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations. In this respect, policies promoting or perpetuating apartheid, racial segregation, discrimination, colonial and other forms of oppression and foreign domination stand condemned and must be eliminated.

Principle 2 — The natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

Principle 3 — The capacity of the earth to produce vital renewable resources must be maintained and, wherever practicable, restored or improved.

Principle 4 — Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat, which are now gravely imperilled by a combination of adverse factors. Nature conservation, including wildlife, must therefore receive importance in planning for economic development.

Principle 5 — The non-renewable resources of the earth must be employed in such a way as to guard against the danger of their future exhaustion and to ensure that benefits from such employment are shared by all mankind.

Principle 6 — The discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. The just struggle of the peoples of ill countries against pollution should be supported.

Principle 7 — States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

Principle 8 — Economic and social development is essential for ensuring a favorable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life.

Principle 9 — Environmental deficiencies generated by the conditions of under-development and natural disasters pose grave problems and can best be remedied by accelerated development through the transfer of substantial quantities of financial and technological assistance as a supplement to the domestic effort of the developing countries and such timely assistance as may be required.

Principle 10 — For the developing countries, stability of prices and adequate earnings for primary commodities and raw materials are essential to environmental management, since economic factors as well as ecological processes must be taken into account.

Principle 11 — The environmental policies of all States should enhance and not adversely affect the present or future development potential of developing countries, nor should they hamper the attainment of better living conditions for all, and appropriate steps should be taken by States and international organizations with a view to reaching agreement on meeting the possible national and international economic consequences resulting from the application of environmental measures.

Principle 12 — Resources should be made available to preserve and improve the environment, taking into account the circumstances and particular requirements of developing countries and any costs which may emanate- from their incorporating environmental safeguards into their development planning and the need for making available to them, upon their request, additional international technical and financial assistance for this purpose.

Principle 13 — In order to achieve a more rational management of resources and thus to improve the environment, States should adopt an integrated and coordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve environment for the benefit of their population.

Principle 14 — Rational planning constitutes an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment.

Principle 15 — Planning must be applied to human settlements and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social, economic and environmental benefits for all. In this respect projects which are designed for colonialist and racist domination must be abandoned.

Principle 16 — Demographic policies which are without prejudice to basic human rights and which are deemed appropriate by Governments concerned should be applied in those regions where the rate of population growth or excessive population concentrations are likely to have adverse effects on the environment of the human environment and impede development.

Principle 17 — Appropriate national institutions must be entrusted with the task of planning, managing or controlling the 9 environmental resources of States with a view to enhancing environmental quality.

Principle 18 — Science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems and for the common good of mankind.

Principle 19 — Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension. It is also essential that mass media of communications avoid contributing to the deterioration of the environment, but, on the contrary, disseminates information of an educational nature on the need to project and improve the environment in order to enable mal to develop in every respect.

Principle 20 — Scientific research and development in the context of environmental problems, both national and multinational, must be promoted in all countries, especially the developing countries. In this connection, the free flow of up-to-date scientific information and transfer of experience must be supported and assisted, to facilitate the solution of environmental problems; environmental technologies should be made available to developing countries on

terms which would encourage their wide dissemination without constituting an economic burden on the developing countries.

Principle 21 — States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 22 — States shall cooperate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction.

Principle 23 — Without prejudice to such criteria as may be agreed upon by the international community, or to standards which will have to be determined nationally, it will be essential in all cases to consider the systems of values prevailing in each country, and the extent of the applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for the developing countries.

Principle 24 — International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big and small, on an equal footing. Cooperation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way, that due account is taken of the sovereignty and interests of all States.

Principle 25 — States shall ensure that international organizations play a coordinated, efficient and dynamic role for the protection and improvement of the environment.

Principle 26 — Man and his environment must be spared the effects of nuclear weapons and all other means of mass destruction. States must strive to reach prompt agreement, in the relevant international organs, on the elimination and complete destruction of such weapons.

Annex 2: Rio 1992 Principles (Rio Declaration, 1992)

Principle 1 — Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

Principle 2 — States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 3 — The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Principle 4 — In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it.

Principle 5 — All States and all people shall co-operate in the essential task of eradicating poverty as an indispensable requirement for sustainable development, in order to decrease the disparities in standards of living and better meet the needs of the majority of the people of the world.

Principle 6 — The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries.

Principle 7 — States shall co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 8 — To achieve sustainable development and a higher quality of life for all people, States should reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies.

Principle 9 — States should co-operate to strengthen endogenous capacity-building for sustainable development by improving scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies, including new and innovative technologies.

Principle 10 — Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Principle 11 — States shall enact effective environmental legislation. Environmental standards, management objectives and priorities should reflect the environmental and developmental context to which they apply. Standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries.

Principle 12 — States should co-operate to promote a supportive and open international economic system that would lead to economic growth and sustainable development in all countries, to better address the problems of environmental degradation. Trade policy measures for environmental purposes should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade. Unilateral actions to deal with environmental challenges outside the jurisdiction of the importing country should be avoided. Environmental measures addressing transboundary or global environmental problems should, as far as possible, be based on an international consensus.

Principle 13 — States shall develop national law regarding liability and compensation for the victims of pollution and other environmental damage. States shall also co-operate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction.

Principle 14 — States should effectively co-operate to discourage or prevent the relocation and transfer to other States of any activities and substances that cause severe environmental degradation or are found to be harmful to human health.

Principle 15 — In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Principle 16 — National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Principle 17 — Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.

Principle 18 — States shall immediately notify other States of any natural disasters or other emergencies that are likely to produce sudden harmful effects on the environment of those States. Every effort shall be made by the international community to help States so afflicted.

Principle 19 — States shall provide prior and timely notification and relevant information to potentially affected States on activities that may have a significant adverse transboundary environmental effect and shall consult with those States at an early stage and in good faith.

Principle 20 — Women have a vital role in environmental management and development. Their full participation is therefore essential to achieve sustainable development.

Principle 21 — The creativity, ideals and courage of the youth of the world should be mobilized to forge a global partnership in order to achieve sustainable development and ensure a better future for all.

Principle 22 — Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.

Principle 23 — The environment and natural resources of people under oppression, domination and occupation shall be protected.

Principle 24 — Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and co-operate in its further development, as necessary.

Principle 25 — Peace, development and environmental protection are interdependent and indivisible.

Principle 26 — States shall resolve all their environmental disputes peacefully and by appropriate means in accordance with the Charter of the United Nations.

Principle 27 — States and people shall co-operate in good faith and in a spirit of partnership in the fulfilment of the principles embodied in this Declaration and in the further development of international law in the field of sustainable development.

Annex 3: Millennium Development Goals (UN MDGs, 2015)

Annex 4: Sustainable Development Goals (SDGs, 2018)