1 Introduction

1.1 Relationship between sustainable development and access to knowledge

Sustainable development consists of a type of development that rests on three interdependent pillars: economic, social and environmental. The economic pillar refers to the need to expand business activity and the capacity of this sector to produce goods and services that meet the demands of society.[1] The social pillar refers to the realization of the human right to development,[2] defined as the right to all fundamental freedoms and human rights guaranteed to all individuals by the International Bill of Human Rights, comprising the Universal Declaration of Human Rights (UDHR), the International Covenant on Civil and Political Rights (ICCPR) and the International Covenant on Economic, Social and Cultural Rights (ICESCR).[3] Finally, the environmental pillar refers to the protection of the environment and its resources for present and future generations.[4] Or, in the words of the 1987 Brundtland Report prepared by the World Commission on Environment and Development, "[s]ustainable development requires meeting the basic needs of *all* and

[1] See principles 8, 9 and 11 of the Stockholm Declaration of the United Nations Conference on the Human Environment 1972 (Stockholm Declaration).
[2] Principle 3 of the Rio Declaration on Environment and Development 1992 (Rio Declaration) reads: "The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations."
[3] Art. 1(1) of the United Nations Declaration on the Right to Development (UNGA, Resolution 41/128) defines the right to development as "an inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized." Art. 6 of the Declaration reaffirms the interdependence of human rights and the duty of states to engage in the realization of all fundamental freedoms and human rights. This implies that the right to development is not observed if a certain State gives priority to the realization of economic, social and cultural rights, while neglecting the observance of civil and political rights, or vice versa.
[4] See, e.g., principles 2, 3, 4 and 5, Stockholm Declaration.

extending to *all* the opportunity to satisfy their aspirations for a better life . . . In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations."[5]

In harmony with the definition adopted by this study, the 2002 Convention for Cooperation in the Protection and Sustainable Development of the Marine and Coastal Environment of the Northeast Pacific adopts a definition of sustainable development which outlines its three interdependent pillars of support:

> "Sustainable development" means the process of progressive change in the quality of life of human beings, *which places it as the centre and primordial subject of development*, by means of economic growth with s*ocial equity* and the transformation of methods of production and consumption patterns, and which is *sustained in the ecological balance and vital support of the region*. This process implies respect for regional, national and local *ethnic and cultural diversity*, and the full participation of people in peaceful *coexistence and in harmony with nature*, without prejudice to and ensuring the *quality of life of future generations* (art. 1(a)). (emphasis added)

In a scenario marked by the absence of industrial and commercial activity, there are no jobs, just subsistence farming and over-exploitation of natural resources as a way to temporarily relieve the evils of material poverty in which large segments of the population live. Economic progress is therefore a condition for poverty eradication and, hence, sustainable development;[6] however, it does not automatically lead to social welfare. There are cases of materially rich countries, which still retain large parts of their populations living in subhuman conditions. That is the reason why sustainable development requires that economic progress be channeled to enhance the well-being of mankind, by creating conditions that allow the full realization of all human rights guaranteed to all individuals.

But sustainable development requires not only that economic progress goes hand in hand with human rights. In addition, it requires strict observance of the limits imposed by the laws of nature, for a serious but neglected reason: the future of humanity is closely linked to the fate of the biosphere. This requirement is summarized in the award in the *Ijzeren Rijn* case, delivered by the Permanent Court of Arbitration:

[5] World Commission on Environment and Development 1987, cap. 2, paras. 4 and 15.
[6] See principle 5, Rio Declaration.

Since the Stockholm Conference on the Environment in 1972 there has been a marked development of international law relating to the protection of the environment. Today, both international and EC law require the integration of appropriate environmental measures in the design and implementation of economic development activities. Principle 4 of the Rio Declaration on Environment and Development, adopted in 1992 . . . which reflects this trend, provides that "environmental protection shall constitute an integral part of the development process and cannot be considered in isolation from it." Importantly, these emerging principles now integrate environmental protection into the development process. Environmental law and the law on development stand not as alternatives but as mutually reinforcing, integral concepts, which require that where development may cause significant harm to the environment there is a duty to prevent, or at least mitigate, such harm . . . This duty, in the opinion of the Tribunal, has now become a principle of general international law. This principle applies not only in autonomous activities but also in activities undertaken in implementation of specific treaties between the Parties.[7]

Along the same line, Judge Weeramantry, from the International Court of Justice (ICJ), in a separate opinion concerning the *Gabčíkovo-Nagymaros* case, points out that sustainable development is already a principle of international law whose function is to reconcile norms in collision. The only aspect of the opinion open to criticism is that it seems to have considered that sustainable development relies on two pillars – economic development and environmental conservation – while, at present, the international community considers that sustainable development relies on three interdependent pillars. Possibly this oversight (or omission) is due to the fact that the dispute involved a potential conflict between environmental and economic issues:

The problem of steering a course between the needs of development and the necessity to protect the environment is a problem alike of the law of development and of the law of the environment. Both these vital and developing areas of law require, and indeed assume, *the existence of a principle which harmonizes both needs*.

To hold that no such principle exists in the law is to hold that current law recognizes the juxtaposition of two principles which could operate in collision with each other, without providing the necessary basis of principle for their reconciliation. The untenability of the supposition that the law sanctions such a state of normative anarchy suffices to condemn a hypothesis that leads to so unsatisfactory a result.

Each principle cannot be given free rein, regardless of the other. *The law necessarily contains within itself the principle of reconciliation. That principle is the principle of sustainable development* . . . The components of the principle [of sustainable

[7] Permanent Court of Arbitration, award in the arbitration regarding the Iron Rhine ("Ijzeren Rijn") railway between Belgium and the Netherlands, para. 59.

Table 1.1 *Types of growth*

Types of growth	Economic	Human	Ecological
Wild	Positive effects	Negative effects	Negative effects
Socially benign	Positive effects	Positive effects	Negative effects
Stable	Positive effects	Negative effects	Positive effects
Sustainable development	Positive effects	Positive effects	Positive effects

Source: Based on the typology developed by Sachs (2007, 269).

development] come from well-established areas of international law – human rights, State responsibility, environmental law, economic and industrial law, equity, territorial sovereignty, abuse of rights, good neighbourliness – to mention a few. It has also been expressly incorporated into a number of binding and far-reaching international agreements, thus giving it binding force in the context of those agreements. It offers an important principle for the resolution of tensions between two established rights.[8] (emphasis added)

In other words, sustainable development aims to channel most of the fruits of economic growth policies into the implementation of all human rights and fundamental freedoms and into the preservation of the environment for present and future generations. Therefore, policies that pursue, in an isolated and conflicting manner, any of these goals,[9] e.g. a policy that generates socio-economic progress and environmental destruction as a side-effect, or a policy which pursues the preservation of the environment in a manner that neglects the demands of society and economy are not policies that can lead to sustainable development. In this sense, the Rio Declaration on Environment and Development 1992 (Rio Declaration) puts human beings "at the centre of concerns for sustainable development," and states that "they are entitled to a healthy and productive life in harmony with nature" (principle 1), and stresses that "[t]he right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations" (principle 3). Table 1.1 on types of growth sets out the tripod on which rests the ideal of sustainable development and clarifies the differences between this and the other types of growth. The table also facilitates the understanding that sustainable development should not be confused with economic growth at any cost or with environmental preservation detached from socio-economic progress. However, the table does not

[8] Separate opinion of Weeramantry. *Gabčíkovo-Nagymaros Project* (Hungary v. Slovakia), Judgment of September 25, 1997. The Hague: ICJ Reports 1997), pp. 95–99.
[9] See principle 4, Rio Declaration.

make clear that policies directed at promoting sustainable development shall be able to generate positive effects worldwide.

The goal of sustainable development has gained ground on the political agenda of the international community since the United Nations Conference on the Human Environment, which took place in Stockholm in 1972, and from then onwards the international community has been committed to make it a reality.

In the 1980s, the United Nations (UN) commissioned from an independent commission – the World Commission on Environment and Development – a comprehensive study whose aim was to identify the causes of the rapid deterioration of the environment in the second half of the twentieth century and to propose solutions to prevent the installation of global environmental chaos. The work carried out by the World Commission on Environment and Development, known as the Brundtland Report, was published in 1987. In response to the report, the UN bestowed on sustainable development the status of a governing principle in its programs[10] and specialized agencies, and in 1992 it convened in Rio de Janeiro the UN Conference on Environment and Development. During the conference, the international community undertook binding and political obligations aimed at implementing the goal of sustainable development, these being crystallized in, inter alia, the Convention on Biological Diversity, the United Nations Framework Convention on Climate Change, the Rio Declaration on Environment and Development and Agenda 21.

In 2000, the UN Member States committed to achieving by 2015 the so-called Millennium Development Goals: to eradicate extreme poverty and hunger; ensure universal access to primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria and other serious diseases; ensure environmental sustainability; foster a global partnership for development through, amongst other measures, the development of an open and non-discriminatory trading system; meet the material needs of poor countries and promote access to medicines.[11] There is no doubt that the achievement of this set of goals will promote sustainable development.

In 2002, during the World Summit on Sustainable Development, the international community reaffirmed a collective commitment "to advance and strengthen the interdependent and mutually reinforcing pillars of sustainable development – economic development, social development and environmental protection – at the local, national, regional

[10] See UNGA, Resolution 42/187.
[11] See UNGA, United Nations Millennium Declaration (Resolution A/RES/55/2).

and global levels"; "to act together, united by a common determination to save our planet, promote human development and achieve universal prosperity and peace"; and "to ensure that our collective hope for sustainable development is realized."[12]

Sustainable development is also listed as one of the objectives of the multilateral trading system: in 1994, at the end of the GATT Uruguay round of negotiations, which culminated in the creation of the World Trade Organization (WTO), the participating States decided to include sustainable development in the list of objectives pursued by the nascent organization.[13] The inclusion of this objective in the preamble of the Marrakesh Agreement establishing the WTO was not trifling. The preamble of this agreement was based substantially on the preamble of the General Agreement on Tariffs and Trade 1947 (GATT 1947), however, there is a remarkable difference between them and, therefore, their goals. While the preamble of the GATT 1947 named as one of its objectives the promotion of "the full use of the resources of the world," which could lead to the over-exploitation of these resources, the preamble of the Marrakesh Agreement states as one of its goals the promotion of "the optimal use of the world's resources in accordance with the objective of sustainable development, seeking to protect and preserve . . . the environment . . . "[14] This change in approach should be reflected in the approach used to interpret and apply the rules of the WTO legal framework. In order to confirm that the replacement of the GATT 1947 regime by the WTO regime involved a real change of goals, the 1994 Declaration on Trade and Environment, adopted by ministers at the meeting of the Uruguay Round Trade Negotiations Committee in Marrakesh, stresses "that there should not be, nor need be, any policy contradiction between safeguarding and upholding an open, non-discriminatory and equitable multilateral trading system on the one hand, and acting for the protection of the environment, and the promotion of sustainable development on the other."[15]

The 2002 Johannesburg Declaration reaffirmed as essential prerequisites for achieving the goal of sustainable development, amongst others, poverty eradication, changing consumption and production patterns, protecting and managing the natural resource base, the substantial reduction of the socio-economic gap that sets industrialized countries apart

[12] Johannesburg Declaration on Sustainable Development, 2002, paras. 5, 35 and 37.
[13] In *US – Shrimp*, the WTO Appellate Body rightly upheld the widespread view that sustainable development is a type of development that integrates economic and social development and environmental protection (WTO, WT/DS58/AB/R, Report of the Appellate Body, para. 129, footnote 107).
[14] See Hu 2004, 150.
[15] WTO, Decision on Trade and Environment, 1994, preamble.

from developing countries and the equitable distribution of the fruits and costs of economic globalization.[16] The fulfillment of these requirements depends on, inter alia, easier access to modern technologies and other forms of knowledge; capacity building of human resources and improvement of the quality of education.[17] There is therefore a direct relationship between sustainable development and wider access to knowledge.[18]

It is a mistake to believe that scientific, technological and cultural advances depend exclusively on the intellectual sharpness of creators and massive investments in creative and inventive activities. Scientific, technological and cultural development is not a stand-alone, isolated process. Quite the contrary. The development of new knowledge, technologies, processes and products stem from the application of previous information, knowledge and technologies.[19] Briefly, the generation of knowledge is a cumulative process; it is in line with this understanding that Isaac Newton said in a letter written in 1676, addressed to Robert Hooke: "If I have seen further it is by standing on the shoulders of Giants." In this same vein, Judge Story in *Emerson* v. *Davies* underscored that "in literature, in science and in art, there are, and can be, few, if any, things, which, in an abstract sense, are strictly new and original throughout. Every book in literature, science and art, borrows, and must necessarily borrow, and use much which was well known and used before . . . No man writes exclusively from his own thoughts, unaided and uninstructed by the thoughts of others. The thoughts of every man are, more or less, a combination of what other men have thought and expressed, although they may be modified, exalted, or improved by his own genius . . . Virgil borrowed much from Homer; Bacon drew from earlier as well as contemporary minds; Coke exhausted all the known learning of his profession; and even Shakespeare and Milton, so justly and proudly our boast as the brightest originals, would be found to have gathered much from the abundant stores of current knowledge and classical studies in their days."[20]

[16] Johannesburg Declaration on Sustainable Development, paras. 11–14.
[17] *Ibid.*, paras. 18 and 28.
[18] The term "knowledge" entails data, information and knowledge in the strict sense. The elements that make up the notion of knowledge were defined by Elinor Ostrom and Charlotte Hess (2007, 8), based on Machlup, as follows: "Machlup . . . introduced this division of data-information – knowledge, with data being raw bits of information, information being organized data in context, and knowledge being the assimilation of the information and understanding of how to use it. Knowledge . . . refers to all types of understanding gained through experience or study, whether indigenous, scientific, scholarly, or otherwise nonacademic."
[19] See Scotchmer 1991.
[20] *Emerson* v. *Davies*, 8 F. Cas. 615, 619 (CCD Mass. 1845).

As will be seen below, continuous access to a robust stock of different forms of knowledge is the fuel for endogenous capacity building in any country. Furthermore, wider and more facilitated access to knowledge frees developing countries and least developed countries (jointly referred to hereafter as developing countries) from the need to import "ready-made solutions" for their social and environmental challenges[21] and the endless waiting for transfer of knowledge from industrialized countries on favorable terms.[22]

Access to technologies

New technologies are important tools for the efficient implementation of multilateral environmental agreements (MEAs) at the domestic level. In this sense, it should be noted that the UN Convention on Biological Diversity states that compliance by developing countries with their obligations will depend, inter alia, on facilitated access to technologies owned by industrialized countries (art. 20(4)).

Access to technologies and to technological inputs is essential to the development of new products and processes whose aim is to: improve production processes and reuse of industrial waste; be less dependent on energy resources and materials (decarbonization of production processes); facilitate the diagnosis of emerging environmental problems; enable the sustainable exploitation of natural resources; rehabilitate sick ecosystems of the Earth; allow the conservation of natural resources for future generations; prevent risks to the natural environment, produced by human activities, from causing serious or irreversible environmental damage; generate new drugs and therapies to benefit the health of humans and animals; expand substantially the production of food using fewer natural resources, notably water, land and chemical inputs;[23] improve the nutritional quality of foods; develop pesticides that do not poison

[21] See principle 9, Rio Declaration.

[22] For the sake of illustration, it is worth mentioning the results of a recent joint survey conducted by the European Patent Office, the United Nations Environment Programme and the International Centre for Trade and Sustainable Development (ICTSD) (Simmons 2010). According to the survey, patents covering clean energy occupy a prominent place in the portfolio of intangible assets of a growing number of companies in the US, Europe and Japan. Nevertheless, these technologies are transferred, very rarely, to developing countries: out of the 150 companies participating in the poll, 58 percent said they never transferred their clean technologies to developing countries; only 5 percent of the companies surveyed reported having frequently transferred clean technologies to developing countries. The licensed technologies have as targets a small number of developing countries: Brazil, China, India and Russia and, to a lesser extent, Malaysia, Thailand and South Africa.

[23] See De Schutter 2009, 15–16.

human beings and their environment; develop less polluting means of transport; increase access to safe drinking water.[24] Access to technologies is also essential to strengthen the business community, to promote free competition and to release human beings from unhealthy and poorly paid labor.

In other words, access to technologies is indispensable to: guaranteeing the rights to health and to food of all individuals; preventing the phenomenon of the tragedy of the commons, marked by the over-exploitation of natural resources, followed by their deterioration or extinction[25]; stimulating the development of clean energy; generating new jobs, especially in emerging sectors of the economy (biotechnology, nanotechnology, agro-biotechnology and software); promoting the development of new products and new enterprises; reducing the prices of goods and services and expanding access to goods and services by less affluent sectors of society. It is no accident that principle 20 of the Stockholm Declaration on the Human Environment states that:

> 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

[24] There is a great number of international and national instruments that recognize the symbiotic relationship between access to technology and to knowledge and preservation of the environment. See, e.g., principles 18 and 20, Stockholm Declaration 1972; principle 9, Rio Declaration 1992; arts. 16–17, Convention on Biological Diversity; arts. 244, 266 *et seq*., United Nations Convention on the Law of the Sea; Chapter 34, Agenda 21; art. 1(c) and (h) and art. 4(5), UNFCCC; art. 10 (c), Kyoto Protocol on Climate Change; art. 22, Cartagena Protocol on Biosafety to the Convention on Biological Diversity; art. 5(1)(e) and art. 13(2)(a) and (b), International Treaty on Plant Genetic Resources for Food and Agriculture; UNFCCC Copenhagen Accord, paras. 4, 5, 8, 10.

[25] According to Hardin (1968, 1243–1244), "[t]he tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons . . . As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, 'What is the utility *to me* of adding one more animal to my herd?' . . . [T]he rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all."

and that principle 9 of the Rio Declaration provides:

> States should cooperate 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.

Access to knowledge condensed into literary and scientific works

Even if a State has guaranteed free access to all technologies that may be required for its economic development, if its population is not technically enabled to master and apply them productively, access to the advances of science and technology will be meaningless.[26] For this reason, facilitated access to publications in general – literary, artistic and scientific works – plays a central role in scientific and technological progress and in the technical qualification of populations, with a view to enable them to: diagnose new environmental challenges and devise solutions to face them; generate new scientific knowledge on how to extract greater benefits from natural resources, without exhausting them; recover damaged biomes; manage and apply new scientific and technological knowledge for the well-being of humanity.

Access to books and other publications is also essential for the formation of proactive, conscious and responsible citizens, enabled: to act politically; to claim and defend their rights; to distinguish between environmentally sustainable companies and those that degrade the environment; and to make conscious consumer choices. Access to scientific and literary works is equally indispensable to improve the living conditions of individuals. At present, there is no doubt that the higher the qualifications of an individual, the greater his chances of taking a well-paid post. Economically independent individuals are more likely to achieve a happy and fulfilling life. Finally, access to literary and scientific works provides fuel to the process of generating new intellectual productions, resources which are urgently needed for the preservation and continued expansion of cultural diversity.[27]

[26] See Commission on Intellectual Property Rights 2002, 103.

[27] It is worth reproducing here the wording of art. 2(6) of the Convention on the Protection and Promotion of the Diversity of Cultural Expressions 2005, as this provision considers cultural diversity "as a rich asset for individuals and societies" and its "protection, promotion and maintenance . . . an essential requirement for sustainable development for the benefit of present and future generations."