

Out of Obscurity:

The Right to Benefit from Advances in Science and Technology and Its Implications for Global Health

Keynote Address

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Introduction

Professor Te-Chung Tang, Professor Chuan-Feng Wu, distinguished members of the Institutum Iurisprudentiae, honored guests, ladies and gentlemen.

The sense of humility I feel in taking the floor at this the 3rd conference on law, science and technology is only heightened by the overly generous welcome I have received here, on my first visit to the island of Taiwan. It is a great honor for me to find myself among such outstanding scholars but daunting indeed to find myself addressing the topic of “Health and Science: Human Rights and Legal Issues” in front of so many much more qualified than I to address this issue.

My aim is to explore science not as an industry or broad academic endeavour but rather as a source of innovation of value to human well-being. I will set this understanding of science in the context of two interrelated human rights, the first being the very neglected right to benefit from scientific progress and the second being the right to health.

This conference comes at a significant moment since, as I will attempt to demonstrate, telemedicine and e-health, green technology, access to essential medicines, open software and other urgent issues involving science and technology are hotly debated without much reference to the health and human rights, although in an earlier period they were front and center in the human rights debate, especially in the early years of the UN. Let me begin, therefore, by recalling some of that history before proposing elements of the content and applications of the right to benefit from scientific progress.

I. Prologue: Early Concern with Science and Human Rights

The juxtaposition of science and human rights appears to be a novel undertaking of this conference and the organizers deserve enormous credit for bringing into focus the theme of Health, Science, and Human Rights. However, the concern with benefits for the people from advances in science is ancient, going back to the Greeks, the Indians, and of course the Chinese. One need only recall the Four Great Inventions of ancient China¹ (Chinese: 四大發明; Pinyin: Sì dà fā míng), namely, the compass, gunpowder, papermaking, and printing, which are generally regarded as among the most influential to the human race through navigation, warfare, and transmission of knowledge and literature. English philosopher Francis Bacon even said that these discoveries “have changed the whole face and state of things throughout the world ... so much that no empire, no sect, no star seems to have exerted greater power and influence in human affairs than these mechanical discoveries.”¹ Similar references to the history of science recall that advances in science have become part of the common heritage of human rights.

What is novel in what I am addressing is the claim that enjoying these benefits is a human right of everyone. Is that a pious hope? A dangerous exaggeration? A meaningless statement? I will attempt to demonstrate that it is firmly part of formally recognized human rights, that it has been generally neglected throughout the latter half of the last century; that it is relevant to some of the most urgent issues of our day,

1 FRANCIS BACON, *NOVUM ORGANUM*, BOOK I, at CXXIX (1620), available at http://www.constitution.org/bacon/nov_org.htm (last visited July 23, 2012).

and, finally, that there are some useful ways to make it of practical use to both the realization of human rights and the application of scientific advances. Before doing so, let me refer to the ways that the relationship between science and technology and human rights was considered in the beginning of the modern era of international protection of human rights.

This is a story in three chapters. The first is the merging of science and human rights in the Enlightenment; the second is the emergence of bioethics from the criminalization of the abuse of science during World War Two; and the third is the focus on science and technology in the early years of the United Nations.

A. Merging of science and human rights in the Enlightenment

In the West, the theories of human rights that emerged in the 16th and 17th centuries and that took the form of revolutionary movements based on declarations of rights is inseparable from the scientific revolution and the concept of natural philosophy, which meant the scientific study of the physical and natural world. We are astounded today by the intellectual breadth of Diderot and Voltaire or Franklin and Jefferson, but their concern with astronomy, mathematics, chemistry, mechanics, and the diversity of human experience across the globe was integrated into their arguments for the Rights of Man. Through natural philosophy and natural rights, science and human rights were born in the same spirit of empiricism and progress, which characterized the Enlightenment. The bifurcation of human rights into political and legal sciences, administration of justice, and theories of the state, on the one hand, and Natural Philosophy into evolutionary biology, brain research, neuroscience, behavioral psychology, on the other, is a trend that can be described as a separation at birth of these twins who developed in

separate continents, one in the world of hard sciences, sociology, experimental sciences and the like, with applications in engineering, medicine and theoretical physics and cosmology, and the other in the world of moral reasoning, philosophical and political thought and legal theory and practice, with applications in the laws and institutions of human governance.

The Enlightenment was indeed the critical period for science, medicine, and human rights. Referring to the scientific and democratic revolutions, the author of *The Science of Liberty* begins his study of this convergence by affirming, “These two transformations were linked, and remain so today: Every scientific nations in the world at the close of the twentieth century was a liberal, or at least partly liberal, democracy (meaning a state which guarantees human rights to its citizens, who elect their leaders.)”² He argues that these revolutions were not a coincidence, but science sparked the democratic revolution and “that science continues to foster political freedom today.”³

Separately from the possible fostering of political freedom by scientific advance, the Enlightenment represents for the West both the affirmation of the scientific method with the related faith of human progress and the formulation of the human rights which define the freedom and equality on which the legitimacy of modern governments have henceforth been judged. Both concepts advanced in the 19th century, when science applied to industry revolutionized the global economy and generated immense wealth at the expense of colonized peoples and oppressed workers. Both phenomena continue today to challenge us to

2 TIMOTHY FERRIS, *THE SCIENCE OF LIBERTY, DEMOCRACY, REASON, AND THE LAW OF NATURE* 1 (2010).

3 *Id.* at 2.

reflect, in the context of globalization, on the human rights implications of scientific progress. Certainly, in the mid-twentieth century the misuse of science resulted in some of the most egregious denials of human rights in human history.

B. Emergence of bioethics from the criminalization of the abuse of science during World War Two

The second phase of this narrative is the lessons of World War II two centuries later, when the abuse of science was the subject of an international war crimes tribunal, which launched the Nuremburg Code and modern bioethics, on a parallel with the rise of global human rights. In response to the atrocities committed during the Second World War, the organized international community began in the 1940s to define norms of behavior relating to both human rights — exemplified in the Universal Declaration of Human Rights of 1948 — and the specific field of medical experimentation and responsibilities of health practitioners — exemplified by the Nuremburg Code, which was included in the trials and judgment of the Nazi doctors in 1947. The progeny of the Nuremburg Code includes codes of ethics for doctors and nurses, as well as detailed principles relating to research and experimentation. Many of these texts are of a technical nature and are not strictly speaking human rights texts although some basic norms that are included among internationally recognized human rights, such as the prohibition of medical or scientific experimentation without the free consent of the subjects. Others relate to the responsibilities of health practitioners and explicitly invoke human rights, such as the declaration on nurses and human rights and many related texts focus on the role of health practitioners in executions, torture, and related practices. As a leading authority on the subject, George J. Annas, put it, the Nuremburg Code

“was based on what the American judges had heard at trial, including the arguments of American prosecutors and the American physicians who served in the roles of consultant (Leo Alexander) and expert witness (Andrew Ivy) for the prosecution.”⁴ In sum, “modern bioethics was born at the Nuremberg Doctors’ Trial, a health law trial that produced one of the first major human rights documents: the Nuremberg Code.”⁵ Writing a quarter century after the trials a UN expert explained that the misuse of science by the Axis Powers during WWII was one of the most glaring examples of the way in which science and technology can be misused to inflict great suffering.⁶

Other Nuremberg trials of major Axis war criminals led to the adoption of the Nuremberg Principles of accountability for aggression, war crimes, and crimes against humanity, which constituted one dimension of what, along with the Charter of the United Nations and the Universal Declaration, the affirmation of the human rights and fundamental freedoms of all and the foundation for current human rights and humanitarian law.

In 1947 UNESCO convened the Committee on the Theoretical Bases of Human Rights, which sought to clarify the underlying concepts of the draft Universal Declaration. The Committee considered matters of science and technology presented by several of the leading thinkers of the day. J. M. Burgers, Professor at the Technical College of Delft, the Netherlands, for example, underscored that “the part played by science

4 George J. Annas, *The Legacy of the Nuremberg Doctors’ Trial to American Bioethics and Human Rights*, 10 MINN. J.L. SCI. & TECH. 19, 22 (2009).

5 *Id.* at 19.

6 George Brand, *Human Rights and Scientific and Technological Developments*, 4 HUM. RTS. J. 351, 351 (1971).

in modern society makes possible and at the same time puts upon us the obligation of international co-operation, as well as of looking into the future in the interest of coming generations.” He articulated a duty of the community “of setting aside from its funds means for elaborate scientific research, as a means for alleviating wants of mankind, for the development of mankind, and for the pursuit of truth” and proposed that “When scientific work leads to the possibility of technological applications or of other measures of importance for, or affecting in any way, the whole of mankind, such applications or measures should come under the sponsorship of international bodies, deriving their status and power from international authority.”⁷

A. W. Noyes, Professor of Chemistry at the University of Rochester, NY, for his part, felt that “the first duty of the scientist is to ensure that the black spots in the world, where poverty and disease are all too common, are alleviated.”⁸ Aldous Huxley bemoaned the fact that applied science had been in the service of big business first and then of war departments and foreign offices where it “has begotten the flame thrower, the rocket, saturation bombing and the gas chamber, and is now in process of perfecting methods for roasting whole populations by atomic explosions and for killing the survivors by means of man-made leukemia and artificially disseminated plague.”⁹ There is “nothing in the nature of science or technology,” he continues, “which makes it inevitable for the scientific worker to be at the service of monopoly,

⁷ J. M. Burgers, *Rights and Duties Concerning Creative Expression in Particular in Science*, in HUMAN RIGHTS: COMMENTS AND INTERPRETATIONS 215, 216 (UNESCO ed., 1948).

⁸ W. A. Noyes, *Science and the Rights of Man*, in HUMAN RIGHTS: COMMENTS AND INTERPRETATIONS 221, 222 (UNESCO ed., 1948).

⁹ Aldous Huxley, *The Rights of Man and the Facts of the Human Situation*, in HUMAN RIGHTS: COMMENTS AND INTERPRETATIONS 203, 203 (UNESCO ed., 1948).

oligarchy and nationalisms” since “professionally speaking, it would be just as easy for the scientific worker to serve the cause of peace as of war, of personal liberty, voluntary co-operation and self-government as of monopolistic statism or capitalism, universal regimentation and dictatorship.”¹⁰

In its statement on the “Grounds of an International Declaration of Human Rights” of July 1947, the Committee included a “Right to Share in Progress” according to which “Every man has the right to full access the enjoyment of the technical and cultural achievements of civilization.”¹¹ The Committee was particularly concerned “to emphasize the dynamic character of the interrelations of human rights and the need, therefore, to explore and control the basic ideas which are in progress of being fitted to new industrial and technological means for the achievement of human good.”¹² This spirit may have contributed to the inclusion of this right in the Universal Declaration and other normative text to be discussed later.

C. Consideration of human rights and scientific and technological developments in the early years of the United Nations

The third phase is the early work of the United Nations Commission on Human Rights focusing its attention on Science and Human Rights.

In the halcyon days when the United Nations was attempting to find

10 *Id.*

11 The Unesco Committee on the theoretical bases of Human Rights, *The grounds of an international declaration of Human Rights*, in HUMAN RIGHTS: COMMENTS AND INTERPRETATIONS Appendix II 14 (UNESCO ed., 1948).

12 *Id.* at 15.

its human rights legs and flesh out the agenda of the newly established Commission on Human Rights, the memory of the horrendous misuse of science by the Axis Powers was fresh in the minds of the victorious powers. George Brand, a witness to those early discussions, described them as follows: “There is no space in the present expose to recall the various individuals, including some scientists and non-governmental groups who have drawn attention to the above-mentioned threats to human rights posed by recent scientific and technological developments. In course of time, their concerns reached the agenda and work [programs] of inter-governmental bodies ... All the while, the feeling has been developing that an overall study of the impact upon human rights of recent scientific and technological developments should be undertaken on an inter-disciplinary basis.”¹³ With remarkable perceptiveness, Brand anticipated many of the developments we are witnessing today and understood thirty years ago their human rights implications, including those of human genetic manipulation, and more specifically “artificial in vitro fertilization [IVF]; partheno-genesis; choice of sex of offspring; creation of human beings by an asexual process called cloning; manipulation of the DNA molecule so as to interfere with the processes of heredity (‘genetic surgery’); the improvement, by procedures adopted before birth, of the future intelligence of a child; and the creation of part-human chimeras.”¹⁴ That is not a quotation from 2001 but from 1971! “It is easy,” Brand warned, “but dangerous, to dismiss all of these possibilities as science fiction.”¹⁵

Following the adoption of the Universal Declaration, which

¹³ Brand, *supra* note 6.

¹⁴ *Id.* at 354.

¹⁵ *Id.*

explicitly affirmed the right to benefit from scientific progress, the Commission on Human Rights worked from 1949 to 1966 on the International Covenant on Economic, Social and Cultural Rights (ICESCR), which the U.N. General Assembly adopted the on 15 December 1966. Article 15 specifies that States Parties “recognize the right of everyone” both “to enjoy the benefits of scientific progress and its applications”¹⁶ and “to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.”¹⁷ Soon thereafter, the International Conference on Human Rights met in Teheran, Iran, from 22 April to 13 May 1968, where, a group of government leaders met to discuss issues related to human rights and technology and to seek a common understanding of the way in which scientific and technological developments affect human rights, which was reflected in Resolution XI of 12 May 1968. Basing itself on those deliberations, the Conference adopted the Proclamation of Teheran stating, “[w]hile recent scientific discoveries and technological advances have opened vast prospects for economic, social and cultural progress, such developments may nevertheless endanger the rights and freedoms of individuals and will require continuing attention.”¹⁸

Following the Teheran Conference, the United Nations General Assembly adopted Resolution 2450 (XXIII) on 19 December 1968,

16 International Covenant on Economic, Social and Cultural Rights art. 15(1)(b), opened for signature Dec. 16, 1966, U.N. Doc. A/6316 993 U.N.T.S. 3 (entered into force Jan. 3, 1976) [hereinafter ICESCR].

17 ICESCR art. 15(1)(c).

18 PROCLAMATION OF TEHERAN, FINAL ACT OF THE INTERNATIONAL CONFERENCE ON HUMAN RIGHTS, para. 18, U.N. Doc. A/CONF.32/41, U.N. Sales No. pub. E.68.XIV.2 (1968). *See also* U.N. CENTRE FOR HUMAN RIGHTS, UNITED NATIONS ACTION IN THE FIELD OF HUMAN RIGHTS, at 302-06, U.N. Doc. ST/HR/2 Rev.3, U.N. Sales No. Pub. E.88.XIV.2 (1988).

requesting the Secretary-General to create the Advisory Committee on the Application of Science and Technology to Development.¹⁹ The General Assembly shared “the concern expressed by the Teheran Conference that recent scientific discoveries and technological advances, although they open up vast prospects for economic, social and cultural progress, may nevertheless endanger the rights and freedoms of individuals and peoples and consequently call of constant attention.” It tasked the Secretariat, with the assistance of the Advisory Committee, with addressing the following issues of concern with regard to human rights arising out of science and technological advancement: (1) technological advancement – individual privacy and national sovereignty; (2) advances in biology, medicine and biochemistry – protection of physical and intellectual integrity; (3) electronics – limits should be placed on use of such technology in order to protect the rights of individuals; (4) generally, nations should be concerned with balancing scientific and technological progress with human rights and the advancement of humanity. Accordingly the Commission on Human Rights transmitted a preliminary report to the General Assembly at its twenty-fifth session in 1970²⁰ (along with a preliminary memorandum by the World Health Organization dealing with health and human rights²¹) announcing that the Secretariat study would “take into account, as far as possible and in an appropriate manner, the benefits of scientific and technological developments, so as to be able to assess their advantages and disadvantages in the light of the intellectual, spiritual,

19 G.A. Res. 2450, ¶ 1, U.N. Doc. A/RES/2450 (Dec. 19, 1968).

20 UNITED NATIONS, HUMAN RIGHTS AND SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENTS U.N. Sales No. E.90.III.A.3, (C. G. Weeramantry ed., 1990).

21 U.N. G.A. Doc. A/8055/Add.1 (1970).

cultural and moral advancement of mankind.”²² The interim report was issued in February 1970 outlining how the Secretariat proposed to deal with the issues of the privacy of individuals and the sovereignty of nations with regard to recordings and other techniques, the “protection of the human personality and its physical and intellectual integrity in the light of advances in biology, medicine and biochemistry,” and the “use of electronics which may affect the rights of the person and the limits which should be placed on such uses in a democratic society.”²³ Following an update issued in September 1970,²⁴ the final report was issued at the end of December 1970, covering all the issues assigned, namely, privacy threatened by use of recording and other technologies; threats to integrity from advances in biology, medicine and biochemistry; and the uses of electronics, as well as the hazards arising from atomic radiation.²⁵ These efforts focused almost exclusively on threats to human rights raised by advances in science and technology.

The Advisory Committee on the Application of Science and Technology to Development, however, did include the promise of these advances in its work, culminating in the adoption in 1975 of the Declaration on the Use of Scientific and Technological Progress in the Interest of Peace and for the Benefit of Mankind.²⁶ In this brief proclamation, the General Assembly raised both the dangers and the promise of science and technology for human rights. It considered “that, while scientific and technological developments provide ever increasing

22 U.N. Doc. E.CN.4/1028/Add.4 (Feb. 26, 1970).

23 *Id.*

24 U.N. Doc. E.CN.4/1028/Add.5 (Sep. 3, 1970).

25 U.N. Doc. E.CN.4/1028/Add.6 (Dec. 29, 1970), and A/8055.

26 G.A. Res. 3384 (XXX), 30 U.N. GAOR, Supp. No. 34, U.N. Doc. A/10034, at 86 (1975).

opportunities to better the conditions of life of peoples and nations, in a number of instances they can give rise to social problems, as well as threaten the human rights and fundamental freedoms of the individual,” and noted “with concern that scientific and technological achievements can be used to ... deprive individuals and peoples of their human rights and fundamental freedoms,” and “that scientific and technological achievements can entail dangers for the civil and political rights of the individual or of the group and for human dignity.”²⁷ It “reaffirmed ... the need to respect human rights and freedoms and the dignity of the human person in the conditions of scientific and technological progress” and solemnly proclaimed that “All States shall promote international co-operation to ensure that the results of scientific and technological developments are used ... for the purpose of the economic and social development of peoples and the realization of human rights and freedoms in accordance with the Charter of the United Nations” and “shall take appropriate measures to prevent the use of scientific and technological developments, particularly by the State organs, to limit or interfere with the enjoyment of the human rights and fundamental freedoms of the individual.”²⁸

Coming closer to the notion of a right to benefit from scientific progress, the Declaration proclaimed that “All States shall co-operate in the establishment, strengthening and development of the scientific and technological capacity of developing countries with a view to accelerating the realization of the social and economic rights of the peoples of those countries” and “take measures to extend the benefits of science and technology to all strata of the population and to protect them,

²⁷ *Id.* at Preamble.

²⁸ *Id.* ¶¶ 1, 2.

both socially and materially, from possible harmful effects of the misuse of scientific and technological developments, including their misuse to infringe upon the rights of the individual or of the group, particularly with regard to respect for privacy and the protection of the human personality and its physical and intellectual integrity.”²⁹

However, the work of the United Nations following the 1975 Declaration, focused on such issues of the misuse of psychiatric treatment of detained dissidents and guidelines on personalized computer files as they affect the privacy of the individual.³⁰ The Sub-Commission carried out studies on such issues as unlawful human experimentation and recent advances in computer and microcomputer technology.³¹ UNESCO, of course, was programmatically engaged in science policy and applications of science and technology to development but not as a human right. In that period it developed and adopted in 1974 the Recommendation on the Status of Scientific Researchers,³² a normative instrument relating to science but which does not address the right to benefit from scientific progress.

Two decades later, the World Conference on Human Rights (1993), convened on the 45th anniversary of the adoption of the UDHR, reaffirmed the right but once again emphasized the negative dimensions of threats to human rights from scientific advances rather than the

29 *Id.* ¶¶ 5, 6.

30 These matters were entrusted in the later 1970s by the Commission on Human Rights to the Sub-commission on Prevention of Discrimination and Protection of Minorities, which commissioned special rapporteurs Erica-Irene Daes and Louis Joinet respectively to study them.

31 *See, e.g.*, Commission on Human Rights resolutions 1982/4 of 19 February 1982 and 1984/29 of 12 March 1984, G.A. Res. 40/112 (Dec. 13, 1985).

32 General Conference, *Recommendation on the Status of Scientific Researchers*, at 169, UNESCO Doc. 18C/Res. (1975).

positive right to share the benefits of progress:

Everyone has the right to enjoy the benefits of scientific progress and its applications. The World Conference on Human Rights notes that certain advances, notably in the biomedical and life sciences as well as in information technology, may have potentially adverse consequences for the integrity, dignity and human rights of the individual, and calls for international cooperation to ensure that human rights and dignity are fully respected in this area of universal concern.³³

The theme of access to science and technology was taken up indirectly a few years later by UNESCO's Intergovernmental Bioethics Committee (IGBC) and the International Bioethics Committee (IBC).³⁴ Three normative instruments have emerged from that effort: the Universal Declaration on the Human Genome and Human Rights (1997), the International Declaration on Human Genetic Data (2003), and the Universal Declaration on Bioethics and Human Rights (2005). The proposition that human rights should constrain advances in science and

³³ Vienna Declaration and Program of Action, ¶ 11, U.N. Doc. A/CONF.157/23 (July 12, 1993).

³⁴ The IGBC was created in 1998, under Article 11 of the Statutes of the International Bioethics Committee (IBC) and consists of 36 Member States. It meets at least once every two years to examine the advice and recommendations of the IBC and submit proposals for follow-up of the IBC's work to UNESCO's Director-General for transmission to Member States, the Executive Board and the General Conference. However, the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), which is "an advisory body and forum of reflection composed of 18 independent experts, ... mandated to formulate ethical principles that could provide decision-makers with criteria that extend beyond purely economic considerations," has not examined the right to benefit from scientific progress. *See* World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), <http://www.unesco.org/new/en/social-and-human-sciences/themes/science-and-technology/comest/> (last visited Mar. 1, 2012).

technology affecting human nature is reflected in UNESCO's Declarations of 1997 and 2005. The 1997 Declaration acknowledges in that "states should seek to encourage measures enabling ... developing countries to benefit from the achievements of scientific and technological research so that their use in favor of economic and social progress can be to the benefit of all."³⁵ The 2005 Declaration is more explicit when it includes among its purposes "to recognize the importance of freedom of scientific research and the benefits derived from scientific and technological developments, while stressing the need for such research and developments to occur within the framework of ethical principles set out in this Declaration and to respect human dignity, human rights and fundamental freedoms; ... [and] (f) to promote equitable access to medical, scientific and technological developments as well as the greatest possible flow and the rapid sharing of knowledge concerning those developments and the sharing of benefits, with particular attention to the needs of developing countries."³⁶ Even more explicit is Article 15 on sharing of benefits, in which the General Conference of UNESCO affirms that "Benefits resulting from any scientific research and its applications should be shared with society as a whole and within the international community, in particular with developing countries" and enumerates seven forms to give effect to this principle, benefits.³⁷

35 Universal Declaration on the Human Genome and Human Rights art. 19(a)(iii), UNESCO 29 C/Res. 31 (Nov. 11, 1997).

36 Universal Declaration on Bioethics and Human Rights arts. 2(d), (f), UNESCO SHS/EST/BIO/06/1 (Oct. 19, 2005).

37 The seven non-exhaustive forms are "(a) special and sustainable assistance to, and acknowledgement of, the persons and groups that have taken part in the research; (b) access to quality health care; (c) provision of new diagnostic and therapeutic modalities or products stemming from research; (d) support for health services; (e) access to scientific and technological knowledge; (f) capacity-building facilities for

The United Nations University Press published in 1990 *Human Rights and Scientific and Technological Development*, edited by C.G. Weeramantry,³⁸ followed in 1993 by a sequel including a philosophical overview and case studies relating to Western Europe, Eastern Europe (with special reference to Poland), Latin America (Venezuela), South-East Asia (Thailand), and Africa (Ethiopia).³⁹

Occasionally treaty bodies have considered state compliance with the right to benefit from scientific progress. For example, the Committee on Economic, Social and Cultural Rights, after examining the initial report of the People's Republic of China (including Hong Kong and Macao) on the implementation of the International Covenant on Economic, Social and Cultural Rights, urged the government "to remove restrictions on freedom of information and expression in the State party, to enable all persons under its jurisdiction to take part in cultural life, enjoy the benefits of scientific progress and its applications, and benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he or she is the

research purposes; (g) other forms of benefit consistent with the principles set out in this Declaration." *Id.* art. 15.

38 UNITED NATIONS, *supra* note 21, containing chapters on (1) the ways in which both specific human rights and general human rights principles are being undermined by advances in science and technology; (2) a prospective view of science, technology, and human rights; (3) technological self-reliance and cultural freedom; (4) a Western perspective on human rights and scientific and technological progress; (5) normative response of the international community with regard to impacts of scientific and technological progress on human rights; (6) the institutional response; (7) human rights and the structure of the scientific enterprise; (8) human rights, technology, and development; (9) human rights and environmental issues.

39 U.N. THE IMPACT OF TECHNOLOGY ON HUMAN RIGHTS: GLOBAL CASE-STUDIES, U.N. Sales No. E92.III.A.7 (C. G. Weeramantry ed., 1993), containing case studies of Venezuela, Thailand, Eastern Europe and Poland, and Ethiopia of the way in which science and technology impact human rights issues in these countries.

author.”⁴⁰ It made a similar observation concerning Libya, expressing its concern “about reports that freedom of access to the Internet is severely restricted in” Libya and calling on the government “to respect and protect freedom of information and expression . . . , including on the Internet, to enable all persons under its jurisdiction to take part in cultural life and enjoy the benefits of scientific progress and its applications.”⁴¹

These concerns of the United Nations with certain aspects of science and technology as they relate primarily in a negative way to human rights devote almost no attention to the right to benefit from scientific progress, which could well be the most neglected right of the international bill of rights. Recently this right has been brought out of obscurity.

II. International Standards Associated with the Right to Enjoy the Benefits of Scientific Progress and Its Applications

A. The recognition of the Right to Enjoy the Benefits of Scientific Progress and its Applications in human rights instruments

The Universal Declaration of Human Rights, in Article 27, affirms

⁴⁰ U.N. Committee on Economic, Social and Cultural Rights (CESCR), *Concluding observations of the Committee on Economic, Social and Cultural Rights People's Republic of China (including Hong Kong and Macao)*, ¶ 63, E/C.12/1/Add.107 (May 13, 2005).

⁴¹ U.N. Committee on Economic, Social and Cultural Rights (CESCR), *Concluding observations of the Committee on Economic, Social and Cultural Rights*, ¶¶ 21, 39, E/C.12/LYB/CO/2 (Jan. 25, 2006).

that “Everyone has the right freely ... to share in scientific advancement and its benefits,” which Article 15(1)(b) of the International Covenant on Economic, Social and Cultural Rights (ICESCR) expresses as the right “To enjoy the benefits of scientific progress and its applications.” In fact, it was first formulated in the American Declaration of the Rights and Duties of Man (1948) as the right of every person “to participate in the benefits that result from intellectual progress, especially scientific discoveries.”⁴² Similar rights are expressed in the Arab Charter of 2004⁴³, the Protocol of San Salvador to the American Convention on Human Rights of 1988⁴⁴, although the African Charter of Human and Peoples Rights overlooks this right.⁴⁵ The Charter of fundamental rights of the European Union of 2000 takes a different approach to scientific advancement, considering it a threat calling for a reinforcement of fundamental freedoms.⁴⁶

42 American Declaration of the Rights and Duties of Man art. 13, AG/RES. 1591 (XXVIII-O/98) (Resolution adopted at the third plenary session, held on June 2, 1998).

43 Arab Charter on Human Rights, League of Arab States, May 22, 2004, 12 Int’l Hum. Rts. Rep. 893 (2005) (entered into force March 15, 2008). Article 42 reads, “Every person has the right ... and to enjoy the benefits of scientific progress and its application.”

44 Additional Protocol to The American Convention on Human Rights in the Area of Economic, Social and Cultural Rights “Protocol Of San Salvador” (Adopted at San Salvador, El Salvador on November 17, 1988, at the eighteenth regular session of the General Assembly). Article 14 recognizes “the right of everyone ... To enjoy the benefits of scientific and technological progress” as well as ...the benefits to be derived from the encouragement and development of international cooperation and relations in the fields of science, arts and culture... .”

45 Unless one considers that elements of this right may be implied from Article 22’s reference to the right of all peoples “to their economic, social and cultural development ... and in the equal enjoyment of the common heritage of mankind” and “to ensure the exercise of the right to development” and the right of peoples in Article 24 “to a general satisfactory environment favorable to their development.”

46 The Preamble to the European Charter of Fundamental Rights it is necessary to strengthen the protection of fundamental rights in the light of changes in society,

Little thought seems to have gone into the formulation of this right and into its interpretation, until UNESCO took it up again in the twenty-first century.

B. Venice Statement on the Right to Enjoy the Benefits of Scientific Progress and its Applications

Although human rights issues related to science and technologies continued to be on the international human rights agenda around such issues as cloning, genetic information, and access to medicines, which have been taken up by the IBC and by the Commission on Human Rights (now Human Rights Council), they were not usually expressed in relation to the right to share the benefits of scientific progress.

UNESCO did take up the issue in those terms in 2007 when it convened an expert meeting in Amsterdam, the Netherlands (June 2007), organized with the Amsterdam Centre for International Law of the University of Amsterdam, followed the next year by a second meeting in Galway, Ireland (November 2008), organized and the Irish Centre for Human Rights, National University of Ireland (NUI). According to UNESCO the aim of Amsterdam meeting was “to elucidate the content of a right, which despite its significance on all spheres of human life and its early normative entrenchment has received over the years very little attention.”⁴⁷The third experts’ meeting on the right to enjoy the benefits of scientific progress and its applications was organized by UNESCO and the European Inter-University Centre for Human Rights and

social progress and scientific and technological developments by making those rights more visible in a Charter.

47 UNESCO, Report on the Experts’ Meeting on the Right to Enjoy the Benefits of Scientific Progress and its Applications, at 3 (June 7-8, 2007).

Democratisation (EIUC) in Venice, Italy, 16-17 July 2009. The Office of the UN High Commissioner for Human Rights (OHCHR), the Committee on Economic, Social and Cultural Rights (CESCR or the Committee) also participated in the meeting,⁴⁸ as did I and a number of specialists from the scientific and human rights communities. The Venice Statement noted but did not entirely settle the matter of the compatibility of the right with the need for incentives in developments in science and technology and the protection of the rights of the intellectual property of inventors, which itself is protected by Article 15(1)(c) of ICESCR.⁴⁹

The initiative in Venice has had some reverberations. For example, the American Association for the Advancement of Science (AAAS) took up the issue and in April 2010, the AAAS Board of Directors adopted a statement emphasizing the vital connection between Article 15 and the mission of the organization. The AAAS has been coordinating the involvement of the U.S. scientific community in the process of defining and promoting the right. Specifically the Science and Human Rights Coalition, a network of over 45 scientific membership organizations, has undertaken the following four initiatives.

(1) The Welfare of Scientists working group is developing an awareness raising piece aimed at putting scientific freedom on the agenda of the UN human rights mechanisms and human rights organizations more broadly;

⁴⁸ *Id.*

⁴⁹ International Covenant on Economic, Social and Cultural Rights, U.N. Doc. A/6316 (1966), 993 U.N.T.S. 3 (entered into force Jan. 3, 1976) [hereinafter ICESCR]. ICESCR art. 15(1)(c): “The States Parties to the present Covenant recognize ... the right of everyone: To benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author.”

(2) The Service to the Scientific Community working group is engaging individual disciplinary societies in the exercise of defining the right for the purposes of their discipline;

(3) The Service to the Human Rights Community working group is developing indicators by which to measure compliance with the right; and

(4) The Education and Information Resources working group is developing an online training module, including multi-media components, on Article 15.⁵⁰

The engagement of scientists in finding ways within their professional activities, to advance this right is essential to lifting it out of the obscurity where it now is consigned. The tough question, to which I will return in the conclusion, is whether the free functioning of the market with patent protection for inventors, including for corporations that manufacture and market products that are the result of advances in science and technology, is a necessary conditions for scientific progress, even if it means that those who lack resources will not benefit and therefore the right to share in the benefits of scientific progress does not really belong to “everyone.” The alternative view, echoing the 1947 Committee on the Theoretical Bases of Human Rights, is that of scientific advances as a public good. The Venice meeting was divided on the matter.⁵¹ The statement adopted by the meeting acknowledged, “the right to enjoy the benefits of scientific progress and its applications may create tensions with the intellectual property regime, which is a

⁵⁰ Information provided by Jessica Wyndham of the AAAS Science and Human Rights Program.

⁵¹ UNESCO, *supra* note 48, at 7.

temporary monopoly with a valuable social function that should be managed in accordance with a common responsibility to prevent the unacceptable prioritization of profit for some over benefit for all.”⁵²

III. Normative Content and State Obligations to Realize Right to Enjoy the Benefits of Scientific Progress and Its Applications

The Venice expert meeting on the Right to Enjoy the Benefits of Scientific Progress and its Applications elucidated the core content of the right and defined State obligations and recommendations for international cooperation. In the final statement the participants suggested ways to move forward with the interpretation and the implementation of the right. The normative content followed the approach of the Committee on Economic Social and Cultural Rights by defining the normative content and distinguishing duties of states to respect, to protect, and to fulfill.

There were four elements of the normative content highlighted by the experts. The first had to do with creating “an enabling and participatory environment for the conservation, development and diffusion of science and technology” through academic and scientific freedom, equal access and participation, and education. The second is “Enjoyment of the applications of the benefits of scientific progress,” which includes technology transfer and capacity-building. The third element of normative content is “protection from abuse and adverse

⁵² *Id.* at 15.

effects of science and its applications,” such as stem cell research, and climate change.⁵³

The obligations of the state regarding this right were expressed as follows and I will quote in full as this represents the first effort to set out the specific obligations beyond its very general formulation in the core instruments quoted.

A. Duty to Respect

a) to respect the freedoms indispensable for scientific research and creative activity, such as freedom of thought, to hold opinions without interference, and to seek, receive, and impart information and ideas of all kinds;

b) to respect the right of scientists to form and join professional societies and associations, as well as academic autonomy;

c) to respect the freedom of the scientific community and its individual members to collaborate with others both within and across the country’s borders, including the free exchange of information, research ideas and results;

d) to take appropriate measures to prevent the use of science and technology in a manner that could limit or interfere with the enjoyment of the human rights and fundamental freedoms.”

B. Duty to Protect

a) to take measures, including legislative measures, to

⁵³ *Id.* at 16.

prevent and preclude the utilization by third parties of science and technologies to the detriment of human rights and fundamental freedoms and the dignity of the human person by third parties;

b) to take measures to ensure the protection of the human rights of people subject to research activities by entities, whether public or private, in particular the right to information and free and informed consent.

C. Duty to Fulfill

a) to adopt a legal and policy framework and to establish institutions to promote the development and diffusion of science and technology in a manner consistent with fundamental human rights. The relevant policies should be periodically reviewed on the basis of a participatory and transparent process, with particular attention to the status and needs of disadvantaged and marginalized groups;

b) to promote access to the benefits of science and its applications on a non-discriminatory basis including measures necessary to address the needs of disadvantaged and marginalized groups;

c) to monitor the potential harmful effects of science and technology, to effectively react to the findings and inform the public in a transparent way;

d) to take measures to encourage and strengthen international cooperation and assistance in science and technology to the benefit of all people and to comply in this regard with the States' obligations under international law;

e) to provide opportunities for public engagement in

decision-making about science and technology and their development;

f) to institute effective science curricula at all levels of the educational system, particularly in the State-sponsored schools, leading to development of the skills necessary to engage in scientific research.⁵⁴

IV. Emerging Issues of the Right to Enjoy the Benefit of Scientific Progress and Its Applications

The right to enjoy the benefits of scientific progress and its applications is indeed a neglected right. And yet there are several burning issues facing the international community with respect to which it takes on special salience. Let me examine four such areas of scientific progress the benefits of which are not equally shared, namely, information and communication technology, medicine, green technologies, and food production.

A. Information and Communications Technology

Science and technology has made it possible to collect and assess vast amounts of data, report the news instantaneously from anywhere through satellite feeds, store the books of the world's great libraries in digital form, transfer small and vast sums of money across the world, conference face-to-face among numerous people located on all continents, carry out intricate surgical operations remotely and thousands of other applications that improve live in ways that science fiction barely

⁵⁴ *Id.* at 17.

imagined a half century ago. The global economy in the 21st century is characterized in large part by the exponential growth of information and communication technology. The World Summit on the Information Society (WSIS) addressed some of the issues but not adequately the human rights claims.

We can agree that the World Wide Web is too expensive for millions of people in developing countries, partly because of the cost of computers and partly because of government restrictions on free access to information and of the trends in the global economy to capture and market information, contrary to the human rights to enjoy cultural products and to benefit from advances in science and technology.

As we said to the World Summit on the Information Society, “The massive disparities in access to information and to the means of communication—known as “the digital divide”—are a result of the unequal distribution of wealth among and within countries. The digital divide is at the same time a cause and a consequence of the unequal distribution of wealth in the world and within countries. Like poverty, with which it is closely connected, it severely diminishes the capabilities of people to enjoy their human rights. Information and communication technologies (ICTs) enable and empower individuals and groups, particularly those who are exposed, marginalized and vulnerable. Unless ICTs are made available on a vast scale to those who are at the losing end of the digital divide, the information and communication society will remain a force of relative impoverishment of large swaths of the world’s population and consequently a source of instability and deprivation.”⁵⁵

55 The World Summit on the Information Society (WSIS), *Statement on Human Rights*,

India and China are significant testing grounds for the proposition that human rights can serve as positive guidelines for placing the information society in the service of people rather than a source of economic advantage for those who dominate the world economy. India offers the technological edge to breaking barriers to Internet access through the efforts of academics at the Indian Institute of Science and engineers at the Bangalore-based design company Encore Software, who have designed innovative devices, the intellectual property rights to which have been transferred for free to the non-profit Simputer Trust, which is licensing the technology to manufacturers at a nominal fee.⁵⁶ China is grappling with the need to expand access to ICT as it seeks to reduce inequalities produced by its rapid growth, with its habits as a Communist Party State to control citizens' access to information. How it handles this issue will have tremendous repercussions on human rights in the global economy.

On October 5, 2009, the International Telecommunication Union (ITU) hosted a Telecom World Forum in Geneva, at which leaders discussed issues such as “development; ICTs and climate change; and cyber security; as well as technology foresight and access; empowering development through communications; and business models and policy developments.”⁵⁷ This forum brought together leaders who represented governments, international organizations, and the business industry in order to discuss the way in which information communication

Human Dignity and the Information Society, ¶ 7 (Nov. 4, 2003).

⁵⁶ Human Development Report 2001, PC World 2000; Simputer Trust 2000; Kirkman 2001.

⁵⁷ International Telecommunication Union (ITU), *Importance of ICT in Development, Human Rights Highlighted at ITU Telecom World 2009* (Oct. 5, 2009), http://www.un-ngls.org/spip.php?page=article_s&id_article=1641.

technology (ICT) can bring positive change on a global level.

UN Secretary General Ban Ki-moon and the ITU Secretary General Touré gave opening remarks. Mr. Ban Ki-moon emphasized that the United Nations should use ICT to address related to peace, human rights, developments and climate change. He urged governments and businesses to develop “more creative ways to use ICTs to usher in a new green economy” and added, “Let us work together to find new ways to cut waste, reduce emissions, create jobs, protect against disasters and promote better standards of living.”⁵⁸

Similarly, Mr. Touré emphasized that there is a strong relationship between ICTs and human rights. He stated that “[c]ommunication is a basic human right”, and that “if we are to meet the Millennium Development Goals for ICTs then we will need to work in partnership. And we will need to innovate. And we will need to develop new technologies which will help us deliver on our promise to connect the world.”⁵⁹

Probably the most visible advance in technology in the ICT field is broadband, which is transforming societies through use of the Internet in developed countries. The failure to realize the right to advances in technology is reflected in the persistent broadband divide. In 2009, broadband penetration was 27 per cent in developed countries and only 3.5 per cent in developing countries. As the MDG Gap report noted, “fixed broadband subscriptions in the developing world are heavily concentrated in a few countries, with China accounting for half of the 200 million fixed broadband subscriptions, having overtaken the United

58 *Id.*

59 *Id.*

States of America as the largest fixed broadband market in the world in 2008.”⁶⁰ The worst off is Oceania, South Asia and sub-Saharan Africa, where penetration rates are less than 1 per cent.

Similar observations can be made regarding increasing usage of mobile cellular telephones another issue debated at the forum was new mobile technologies that can revolutionize ICT in developing countries. In recent years, the number of subscribers of mobiles phones has increased tremendously. However, there are still regional disparities in the use of mobile technologies and internet connections. As pointed out in the latest MDG GAP Report, “The steady growth of the number of mobile cellular subscriptions is striking, reaching an estimated 4.6 billion by the end of 2009 and a penetration level of 68 per 100 inhabitants globally. In contrast, fixed telephone lines continued to lose their share in the market with a penetration of less than 18 per 100 inhabitants globally.”⁶¹ The problem of access to the benefits of these advances in technology is again cost, especially to reach remote areas: Although prices are continuing decline, the price of fixed broadband services exceeds monthly gross national income (GNI) per capita in 28 LDCs. The monthly average prices of ICT services by region, in 2009, was US\$28 (in purchasing power parity dollars) in developed countries and US\$190 in developing countries, of which Africa was paying US\$426 or 15 times as much.⁶²

The more controversial issue regarding any purported right to

60 UNITED NATIONS U.N. MILLENNIUM DEVELOPMENT GOAL 8, THE GLOBAL PARTNERSHIP FOR DEVELOPMENT AT A CRITICAL JUNCTURE, at 71, U.N. Sales No. E. 10.1.12 (2010).

61 *Id.* at 70.

62 *Id.* at 73.

benefit from advances in ICT is whether the broadband spectrum and the Internet can be part of the “commons,” that is resources that are free for the use of all. Lawrence Lessig argues that commercial and government interests should not interfere with the freedom to innovate and create over the Internet. He is a founder of the Creative Commons, which issues licenses so that creators can communicate which rights they reserve, and which rights they waive for the benefit of recipients or other creators. Such a stance only goes part way to overcoming the obstacles of a right for all to benefit from ICT.

Clearly the right to benefit from advances in ICT has a long way to go. What about medicine?

B. Medicine

The AIDS pandemic has forced the international community to face head-on the greatest challenge for the right to benefit from scientific progress, namely, the protection of intellectual property of patent-holders when millions face death due to the unavailability of life-saving medicines. From a legal perspective, we are dealing here with the confrontation—dare I say a struggle for life and death—between two human rights: the right “to the protection of the moral and material interests resulting from any scientific, literary or artistic production” (Article 15(1)(c) of the ICESCR) and the right “to share in scientific advancement and its benefits” (Article 15(1)(b)). The former is the human rights basis for intellectual property protection, according to which creative ideas and expressions of the human mind that possess commercial value receive the legal protection of property rights called “intellectual property rights (IPRs)”. The major legal mechanisms for protecting IPRs are copyrights, patents, and trademarks. IPRs enable owners to select who may access and use their property, and to protect it

from unauthorized use. There is an apparent contradiction between these two rights when applied to access to medicines: article 15(1)(c) seems to protect the “right” of pharmaceutical companies to earn a profit from the drugs they develop, by setting prices that render medicines inaccessible to the destitute sick, while article 15(1)(b) seems to protect the “right” of those destitute sick to benefit from the development of new drugs.

The way out of this dilemma is to distinguish intellectual property rights from human rights and consider them a temporary monopoly established for the valid social purpose of encouraging scientific invention and artistic creation. In other words, an IPR is a legally protected interest of a lower order than a human right, which implies a superior moral and legal claim. This distinction should not be interpreted to imply that IPRs do not have social value for indeed they have a very high value, justifying limiting article 15 rights reasonably to promote innovation and creativity.

Human rights organs have progressively addressed this dilemma, articulating in different stages the human right to essential medicines. The Commission on Human Rights adopted a resolution in 2001, in which it recognized “that access to medication in the context of pandemics such as HIV/AIDS is one fundamental element for achieving progressively the full realization of the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.”⁶³ Among a list of measures, it called on States, “to refrain from taking measures which would deny or limit equal access for all persons to preventive, curative or palliative pharmaceuticals or medical

⁶³ U.N. Commission on Human Rights, *Access to Medication in the Context of Pandemics such as HIV/AIDS*, ¶ 1, U.N. Doc. E/CN.4/RES/2001/33 (Apr. 20, 2001).

technologies used to treat pandemics such as HIV/AIDS or the most common opportunistic infections that accompany them”⁶⁴ and, clearly with TRIPS in mind, “to ensure that their actions as members of international organizations take due account of the right of everyone to the enjoyment of the highest attainable standard of physical and mental health and that the application of international agreements is supportive of public health policies which promote broad access to safe, effective and affordable preventive, curative or palliative pharmaceuticals and medical technologies.”⁶⁵ The United States was the only government to abstain from this resolution, which was adopted on 23 April 2001 by 52 votes with no votes against.

The Office of the High Commissioner prepared a report in 2001 on the impact of the TRIPS Agreement on human rights,⁶⁶ and the Sub-Commission on the Promotion and Protection of Human Rights took this up in its resolution the same year on “Intellectual Property Rights and Human Rights.”⁶⁷ The resolution, adopted by consensus, referred to the “actual or potential conflict ... between the implementation of the TRIPS Agreement and the realization of economic, social and cultural rights.”⁶⁸ In the context of the upcoming Doha Ministerial meeting of the WTO, the Sub-Commission alluded to the “need to clarify the scope and meaning of several provisions of the TRIPS Agreement, in particular

⁶⁴ *Id.* at ¶ 3(a).

⁶⁵ *Id.* at ¶ 4(b).

⁶⁶ U.N. High Commissioner for Human Rights, *The Impact of the Agreement on Trade Related Aspects of Intellectual Property Rights on Human Rights*, U.N. Doc. E/CN.4/Sub.2/2001/13 (June 27, 2001).

⁶⁷ U.N. Sub-Commission on the Promotion and Protection of Human Rights, *Intellectual property and human rights*, Res. 2001/21, U.N. Doc. E/ CN.4/SUB.2/ RES/2001/21 (Aug. 16, 2001).

⁶⁸ *Id.* at preamble.

of articles 7 and 8 on the objectives and principles underlying the Agreement in order to ensure that States' obligations under the Agreement do not contradict their binding human rights obligations."⁶⁹ It reminded "all Governments of the primacy of human rights obligations under international law over economic policies and agreements, and request[ed] them, in national, regional and international economic policy forums, to take international human rights obligations and principles fully into account in international economic policy formulation."⁷⁰ Significantly, it urged "all Governments to ensure that the implementation of the TRIPS Agreement does not negatively impact on the enjoyment of human rights as provided for in international human rights instruments by which they are bound."⁷¹

A similar view was expressed by the Committee on Economic, Social and Cultural Rights, which "urged WTO members to ensure that their international human rights obligations are considered as a matter of priority in their negotiations which will be an important testing ground for the commitment of States to the full range of their international obligations."⁷² Two years later, on 26 November 2001, the Committee held a "day of general discussion" on article 15(1)(c), following which it issued a "Statement on Human Rights and Intellectual Property," in which it considered that "intellectual property rights must be balanced with the right ... to enjoy the benefits of scientific progress and its

⁶⁹ *Id.*

⁷⁰ *Id.* at ¶ 3.

⁷¹ *Id.* at ¶ 5.

⁷² U.N. CESCR, *Statement of the United Nations Committee on Economic, Social and Cultural Rights to the Third Ministerial Conference of the World Trade Organization* (Seattle, 30 November to 3 December 1999), ¶ 8, U.N. Doc. E/C.12/1999/9 (Nov. 26, 1999).

applications.”⁷³ It made explicit reference to the development of new medicines in the context of the Doha Declaration on the TRIPS Agreement and Public Health as an example of the need to strike a balance between the right to enjoy the benefits of scientific progress and its applications under article 15(1)(b) and the right to benefit from the protection of the moral and material interests under article 15(1)(c).⁷⁴ The Committee concluded by calling for “a mechanism for a human rights review of intellectual property systems.”⁷⁵

The Committee clarified further the human right to essential medicines in two of its General Comments, an earlier one on the right to health, and one based on the 2001 Statement. Indeed, in 2000, the Committee, in its General Comment 14, had interpreted the obligation under Covenant article 12(2)(d) of the Covenant (“The creation of conditions which would assure to all medical service and medical attention in the event of sickness”) to include “the provision of essential drugs.”⁷⁶

But it was in General Comment 17, adopted in 2006, that the Committee challenged head-on the assumption of the international trade regime that the rights of companies holding patents over essential drugs were of the same order as the rights of those who need the drugs, by treating the former as a temporary, revocable monopoly, and the latter as

⁷³ U.N. CESCR, *Human rights and intellectual property: Statement by the Committee on Economic Social and Cultural Rights*, ¶ 4, U.N. Doc. E/C.12/2001/15 (Dec. 14, 2001).

⁷⁴ *Id.* at ¶ 17.

⁷⁵ *Id.* at ¶ 18.

⁷⁶ U.N. CESCR, *The Right to the Highest Attainable Standard of Health (Article 12 of the International Covenant on Economic, Social and Cultural Rights)*, ¶ 17, U.N. Doc. E/C.12/2000/4 (Aug. 11, 2000).

human rights. Indeed, the Committee affirmed,

“In contrast with human rights, intellectual property rights are generally of a temporary nature, and can be revoked, licensed or assigned to someone else. While under most intellectual property systems, intellectual property rights, with the exception of moral rights, may be allocated, limited in time and scope, traded, amended and even forfeited, human rights are timeless expressions of fundamental entitlements of the human person...”⁷⁷

“States parties should,” the Committee continued,

“ensure that their intellectual property regimes constitute no impediment of their ability to comply with their core obligations in relation to the right to health ... States thus have a duty to prevent that unreasonably high license fees or royalties for access to essential medicines ... undermine the right ... of large segments of the population to health”⁷⁸

One of the most significant events, legally and politically, for the right to essential medicines was indeed the Doha Ministerial meeting of the WTO, which adopted the Doha Declaration on the TRIPS Agreement and Public Health. In an unusually direct statement emanating from the WTO, better known for highly technical and legally complex sentences, the meeting declared: “The TRIPS agreement does not and should not prevent Members from taking measures to protect public health ... in

⁷⁷ U.N. CESCR, *The Right of Everyone to Benefit from the Protection of the Moral and Material Interests Resulting from Any Scientific, Literary or Artistic Production of Which He or She Is the Author* (article 15, paragraph 1(c), of the Covenant), ¶ 2, U.N. Doc. E/C.12/GC/17 (Jan. 12, 2006).

⁷⁸ *Id.* at ¶ 35.

particular to promote access to medicines for all.”⁷⁹ To be perfectly clear, the declaration added, “In this connection, we reaffirm the right of WTO members to use, to the full, the provisions in the TRIPS Agreement, which provide flexibility for this purpose,” meaning parallel importing and compulsory licensing. The text acknowledges that “[e]ach member has the right to grant compulsory licences and the freedom to determine the grounds upon which such licences are granted...[and] the right to determine what constitutes a national emergency or other circumstances of extreme urgency, it being understood that public health crises, including those relating to HIV/AIDS, tuberculosis, malaria and other epidemics, can represent a national emergency or other circumstances of extreme urgency.”⁸⁰

The problem is that these flexibilities are almost never applied. They are nevertheless a significant step to put the right to share in the benefits of scientific progress into practice. It should be noted that TRIPS agreement itself states that “the protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation into the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.”⁸¹ At the intergovernmental level, the Global Strategy and Plan of Action on Public Health, Innovation and Intellectual Property defined as one of the

⁷⁹ World Trade Organization, *Doha Declaration on the TRIPS Agreement and Public Health, Ministerial Declaration of 14 November 2001*, ¶ 4, WT/MIN(01)/DEC/2 (Nov. 14, 2001).

⁸⁰ *Id.* at ¶ 5.

⁸¹ Marrakesh Agreement Establishing the World Trade Organization, Annex 1C Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) art. 7, Apr. 15, 1994. 1867 U.N.T.S. 3 (entered into force Jan. 1, 1995).

elements of the strategy to “improve, promote and accelerate transfer of technology between developed and developing countries as well as among developing countries.”⁸² In fact, Element 4 of the Plan of Action is devoted to transfer of technology.⁸³ However, the related government commitments use the language of “promote,” “encourage,” “facilitate,” and “examine the feasibility of...” For example, among that actions to be taken are to “explore and, if feasible, develop possible new mechanisms to promote transfer of and access to key health-related technologies of relevance to public health needs of developing countries.”⁸⁴

As part of his mandate as UN Special Rapporteur on the right of everyone to the enjoyment of the highest attainable standard of physical and mental health, Paul Hunt, presented the Guidelines to the General Assembly in 2008, explaining that “the central objective of the Guidelines is to provide practical, constructive and specific guidance to pharmaceutical companies and other interested parties, including those who wish to monitor companies and hold them to account.”⁸⁵ These forty-seven Guidelines deal with general policy; the disadvantaged; transparency; management, monitoring and accountability; corruption; public policy influence, advocacy and lobbying; quality; clinical trials; neglected diseases; patents and licensing; pricing, discounting and donations; ethical promotion and marketing; public-private partnerships;

82 WHO Sixty-First World Health Assembly, *Global Strategy and Plan of Action on Public Health*, ¶ 14, A61/VR/8 (May 24, 2008).

83 *Id.* at ¶¶ 33–34.

84 *Id.* at ¶ 34.

85 U.N. Secretary-General, *Report of the Special Rapporteur on the Right of Everyone to the Enjoyment of the Highest Attainable Standard of Physical and Mental Health*, ¶ 46, U.N. Doc. A/63/263 (Aug. 11, 2008) (Quotations from the Guidelines are from the version in the annex to that document).

and associations of pharmaceutical companies. They call upon companies to recognize the importance of human rights in their corporate mission and provide board-level responsibility and accountability for its access to medicines strategy, with a public commitment to contribute to research and development for neglected diseases, and respect the right of countries to use TRIPS flexibilities. The Guidelines then address questions of management, including “an effective, transparent, accessible and independent monitoring and accountability mechanism,” both internal and external, as well as participation from a human rights perspective. Other Guidelines would have companies comply with various international standards on corruption, good manufacturing practice, human subject research, and other areas. Special provision relate to promoting research and development on neglected diseases. Regarding patents and licensing, the Guidelines call on drug companies to “respect the right of countries to use, to the full, the provisions ...TRIPS..., which allow flexibility for the purpose of promoting access to medicines, including the provisions relating to compulsory licensing and parallel imports” and “respect the letter and spirit of the Doha Declaration....”

The Human Rights Council recognized “that access to medicine is one of the fundamental elements in achieving progressively the full realization of the right of everyone to the enjoyment of the highest attainable standard of physical and mental health.”⁸⁶

A final example of scientific progress in the medical field is that of gene therapy. Although a National Institutes of Health (NIH) study has stated, “With one notable exception [a French study in which a

⁸⁶ Human Rights Council, Resolution 12/24.

therapeutic transgene was introduced into the bone marrow cells of children], no therapeutic effects have been achieved in gene therapy trials to date,” somatic gene therapy has been studied intensively, with a few successful outcomes.⁸⁷

The potential danger of this type of genetic engineering—and even the inheritability of transgenes—is highly speculative, though “it is not outside the expertise of existing IVF clinics.”⁸⁸ A partner in a biotech investment firm has said, “I suspect there are more groups than we know who are actually working on therapeutic cloning.”⁸⁹

Those who would ban human experimentation in cloning and germline gene therapy—applying a restrictive approach—fear that such technology threatens human existence as we know it because the genome of future generations will undergo unpredictable mutations and thus alter human nature itself. The more permissive approach favors improving human well-being by eliminating life-threatening diseases and enhancing the quality of life and the capacities of human beings. The tension between hope for and fear of advances in biotechnology and genetics has profound philosophical, political, and economic ramifications. This tension is fueled by divergent and partial responses offered by international trade and intellectual property law, human rights law, and specific instruments on biomedicine.⁹⁰ The interpretation of the

87 WORLD HEALTH ORGANIZATION, ADVISORY COMMITTEE ON HEALTH RESEARCH, GENOMICS AND WORLD HEALTH 63-65 (2002).

88 NATIONAL INSTITUTES OF HEALTH, STEM CELLS: SCIENTIFIC PROGRESS AND FUTURE RESEARCH DIRECTIONS 33 (2001).

89 Raja Mishra, Clone Research Quietly Builds in World's Labs, *Boston Globe*, June 21, 2002, at A1.

90 The principal biomedicine instruments are the Council of Europe, Convention for the Protection of Human Rights and Dignity of the Human Being with Regard to the Application of Biology and Medicine: Convention on Human Rights and

human rights implications of cloning and germline therapy is colored by those assumptions, with the consequence that reference to existing instruments of human rights law results at best in ambiguous applications of these standards and more commonly in radically contradictory interpretations. I have proposed a framework for assessing the human rights implications of this technology elsewhere.⁹¹

From the perspective of the right to enjoy the benefits of scientific progress, the issue of altering the human genome generates positions that are the opposite of those relating to ICT or medicine. In the latter areas, the politically progressive approach and the policy option that is the most egalitarian would ensure that people unable to pay market prices have the related goods and services such a Position is based on their right to enjoy the benefits of scientific progress. The progressive position on genetic alteration and the argument most protective of the human person would oppose favoring or even allowing the development of this technology and thereby would not support anyone sharing in the benefits of these advances. The ambiguity of this position is quite explicit in the UNESCO Declaration on the Human Genome and Human Rights. In the same sentence it recognizes “that research on the human genome and the resulting applications open up vast prospects for progress in improving the health of individuals and of humankind as a whole,” and

Biomedicine art. 21, Apr. 4, 1997, E.T.S. No. 164 (entered into force in Dec. 1, 1999); the Council of Europe, Additional Protocol to the Convention for the Protection of Human Rights and the Dignity of the Human Being with Regard to the Application of Biology and Medicine, Jan. 12, 1998, E.T.S. No. 164 (entered into force Mar. 1, 2001); and the Universal Declaration on the Human Genome and Human Rights (UDHGHR), reprinted in Records of the General Conference, UNESCO, 29th Sess., 29 C/Res. 19, at 1 (1997).

⁹¹ Stephen P. Marks, *Tying Prometheus Down: The International Law of Human Genetic Manipulation*, 3 CHI. J. INT'L L. 115, 121-36 (2002).

immediately emphasizes “that such research should fully respect human dignity, freedom and human rights, as well as the prohibition of all forms of discrimination based on genetic characteristics.”⁹² Special precautions are set out for any research on the human genome. For example, “Research which does not have an expected direct health benefit may only be undertaken by way of exception, with the utmost restraint, exposing the person only to a minimal risk and minimal burden and if the research is intended to contribute to the health benefit of other persons in the same age category or with the same genetic condition, subject to the conditions prescribed by law, and provided such research is compatible with the protection of the individual's human rights.”⁹³ The principle of the right to share in benefits of scientific progress creeps back when the Declaration affirms, “Benefits from advances in biology, genetics and medicine, concerning the human genome, shall be made available to all, with due regard for the dignity and human rights of each individual.”⁹⁴ However, the Declaration draws the line at cloning: “Practices which are contrary to human dignity, such as reproductive cloning of human beings, shall not be permitted.”⁹⁵ The UNESCO text, like the European Protocol to the Convention for the Protection of Human Rights and the Dignity of the Human Being with Regard to the Application of Biology and Medicine, assume that reproductive cloning is not an advance in science but an affront to human dignity. A survey on attitudes on this issue in Taiwan found that professionals in healthcare or law as well as younger professionals as an age group demonstrated less opposition to human cloning than religious professionals were more

92 UNESCO, Declaration on the Human Genome and Human Rights, preamble (Nov. 11, 1997).

93 *Id.* art. 5(e).

94 *Id.* art. 12(a).

95 *Id.* art. 11.

strongly opposed to human cloning.⁹⁶ Attitudes will remain divided everywhere on whether such advances in science should be shared. The consensus is must easier to reach on sharing green technology.

C. Green technologies, food security and climate change

Enormous advances are beginning in response to the negative effects of runaway technology and industrial production, in particular the use of fossil fuels and other non-renewable sources of energy and the emission of polluting agents that have spread disease and threatened the protective ozone layer and especially that have contributed to the process of the warming of the planet. The consequence from rising sea levels, flooding of interior rivers and landslides from heavy rain, with deaths and injuries, water contamination, infectious diseases, and indirect effects from loss of shelter, displacement, disruption of livelihoods and networks of social support. Each of these consequences represents clear deprivations of the human rights to life, adequate standard of living, water and sanitation, health, adequate food and adequate housing.

The dilemma here is evident: non-industrialized countries justifiably want to benefit from the advance in technology that have generated the wealth of the rich countries but sharing in this technology means more pollution and global warming. Part of the answer has been to shift the sharing of advances in technology to making green technologies available to poor countries. That is easier said than done.

Although no reference is made to the right to benefit from scientific progress, it is clear that any action to mitigate or adapt to climate change

⁹⁶ Che-Ming Yang, Chun-Chih Chung, Meei-Shiow Lu, Chiou-Fen Lin, *Ethical Attitudes on Human Cloning among Professionals in Taiwan and the Policy Implications for Regulation*, 21 ISSUES L. MED. 35, 35-44 (2005).

effectively requires a sharing of the relevant technologies with the countries lacking the capacity to apply them without coordinated international action. Indeed the United Nations Framework Convention on Climate Change (UNFCCC)⁹⁷ requires all parties to “promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases.”⁹⁸ The transfer of technologies is central to the UNFCCC. Wealthier countries recognize that they contributed more to the climate change problem than developing countries and have greater capacity to deal with it. Under the UNFCCC they agreed to make technologies available to developing countries to assist both in managing the impacts of climate change and in transiting to low-carbon economies. However, technology transfer had not advance until the Bali Conference of the Parties in 2007. One program under the auspices of the UNFCCC that addresses directly the need for the transfer of green technology is the Clean Development Mechanism by which developed countries can meet their reduction commitments by investing in greenhouse gas emission reduction and sustainable development projects in developing countries. The Clean Development Mechanism has two goals: to provide developed countries with some flexibility in how they meet their emissions reduction commitments, and to assist developing countries to achieve sustainable economic development.

As pointed out by the United Nations Development Programme, the

⁹⁷ U.N. Framework Convention on Climate Change (UNFCCC), opened for signature May 9, 1992, U.N. Doc. A/AC.237/18 (Part II)/Add.1 (entered into force Mar. 21, 1994).

⁹⁸ *Id.* art. 4(1)(c).

Clean Development Mechanism is the only greenhouse gas emissions reduction mechanism that involves developing countries. Since these countries are likely to be the most severely affected by the impacts of climate change, the mechanism is intended to provide flows of technology and capital to help them achieve a more sustainable development that is less intensive in greenhouse gas emissions.

The 15th Conference of the Parties to the Framework Convention on Climate Change, meeting in Copenhagen in 2009, failed to produce tangible results for either adaptation or mitigation. However, and 16th COP, meeting in Cancún, Mexico, which just ended on 11 December in 2010,⁹⁹ reached agreement on some important issues, which imply some advance in sharing in scientific progress to reduce global warming emissions (mitigation) and prepare countries to lessen the impacts of climate change (adaptation). Many rejoiced in the fact that China and the US accepted The “Cancun Agreement” locking in emissions reductions targets for 80% of global emissions, establishing of the Green Climate Fund, to serve as a mechanism to deliver support for urgent climate actions such as protecting forests, and shifting to greener energy technologies. The fund will also deliver resources to the newly established technology centers, which will over research, scientific exchange and technical support for countries looking to improve efficiency and reduce emissions from sectors like energy production, transportation, and buildings. Most of the attention of the COP was on financing and less on sharing in scientific progress. The matter of a binding climate treaty was deferred until the 17th COP, which took place in Durban, South Africa in 2011. There the FCCC states parties agreed to

⁹⁹ U.N. Climate Change Conference Cancun, COP 16/ CMP 6, November 29–December 10, 2010.

adopt a universal legal agreement on climate change as soon as possible, and no later than 2015, as well as to establish a second commitment period under the Kyoto Protocol, and to launch the Green Climate Fund.¹⁰⁰ The various mechanisms established under the FCCC contribute to the sharing of scientific progress, but without explicit reference to the human right to such sharing.

The International Council on Human Rights policy has noted that “more than most topics in the climate change arena, actions and decisions on technology will have significant human rights implications” and goes on to note, “For developed and developing countries alike – but especially for the latter where, in many cases, basic human rights still remain unfulfilled and development is therefore pressing – development in the future will increasingly rely on access to efficient, clean and renewable technologies. Indeed, it will require restructuring of entire economies. The imperative to establish security for human rights over the long-term in conditions of climate change will require the dissemination (and transfer) of technologies for energy generation and distribution, for transport, housing, water generation and so forth.”¹⁰¹

The ICHRP proposes “a human rights optic,” which “can help ensure equitable access to new technologies in recipient countries through sensitivity to the possibility of inequalities of access and participation that mutually reinforce privilege and vulnerability.” Its study also notes, “Although social and economic rights are clearly

¹⁰⁰ Report of the Conference of the Parties on its seventeenth Session, held in Durban from 28 November to 11 December 2011, U.N. Doc. FCCC/CP/2011/9, <http://unfccc.int/resource/docs/2011/cop17/eng/09.pdf>.

¹⁰¹ INTERNATIONAL COUNCIL ON HUMAN RIGHTS POLICY, CLIMATE CHANGE: TECHNOLOGY POLICY AND HUMAN RIGHTS (2011), <http://www.ichrp.org/en/projects/138> (last visited Apr. 2, 2012).

relevant to economic development in ‘developing countries,’ the language of rights has only been partially integrated in development discourse.”¹⁰² After examining the obligations of the ICESCR, the study concludes “However, while the ICESCR ... encourages wealthier states to provide assistance to other states to fulfil social and economic rights, there is no binding obligation upon them to do so.”¹⁰³ It does not discuss, however, the ICESCR obligation to ensure that every one enjoys the benefits of scientific progress, under article 15(1)(b).

At the regional level an interesting OAS case is worth recalling. In December 2005, a petition on behalf of Inuit native people from Canada and the United States was filed with the Inter-American Commission of Human Rights, alleging human rights violations due in large part to the failure of the United States to curb its greenhouse gas emissions. Among the rights alleged to be violated is rights “to enjoy the benefits of their culture.”¹⁰⁴ It is interesting that this right is normally read with the right to enjoy the benefits of scientific progress but the petitioners in this case focused more on the harm to culture than on their right to benefit, in this case, from non-greenhouse gas emitting technology. The IACHR dismissed the petition in November 2006 on the basis that the petition failed to establish “whether the alleged facts would tend to characterize a violation of rights protected by the American

102 INTERNATIONAL COUNCIL ON HUMAN RIGHTS POLICY, CLIMATE CHANGE AND HUMAN RIGHTS: A ROUGH GUIDE 14 (2008).

103 *Id.*

104 Petition to the Inter-American Commission on Human Rights Seeking Relief from Violations Resulting from Global Warming Caused by Acts and Omissions of the United States, Submitted by Sheila Watt-Cloutier, with the Support of the Inuit Circumpolar Conference, on Behalf of All Inuit of the Arctic Regions of the United States and Canada (Dec. 7, 2005).

Declaration.”¹⁰⁵ The Petition has nonetheless been praised as one of the first climate change cases linking global warming with the violation of human rights.

The IACHR separately deliberated on the issue in 2011 urged “States to keep human rights at the forefront of climate change negotiations, including in designing and implementing measures of mitigation and adaptation.”¹⁰⁶

A special mention should be made about China. China has been one of the strongest voices against industrialized countries calling on developing countries to bear the burden of mitigation in ways that will slow their development, even if CO₂ emissions result from such development. At the same time, China has shown leadership in developing green technologies. For example on April 2008, the Ministry of Science and Technology (MOST), along with five other government agencies and four UN agencies, hosted a high-level International Forum on Climate Change Science & Technology Innovation in Beijing. The world leaders and experts in the area of green technology discussed the challenge of climate change and the opportunities for innovative solutions for two days with more than 600 participants from 30 countries and over 10 international organizations. By its own description “The forum was aimed to leverage global knowledge and expertise in the fight against climate change by exploring the role of new technologies for increasing energy efficiency, alternative and renewable energy and

¹⁰⁵ Letter from the IACHR to the petitioner (Nov. 16, 2006), *available at* <http://graphics8.nytimes.com/packages/pdf/science/16commissionletter.pdf> (last visited July 24, 2012).

¹⁰⁶ The Inter-American Commission on Human Rights (IACHR), Press release, IACHR Concludes its 141st Regular Session No. 28/11, Apr. 28, 2011, http://www.oas.org/en/iachr/media_center/PReleases/2011/028.asp (last visited July 24, 2012).

adapting to climate change.”¹⁰⁷

As the UNDP Resident Coordinator notes, “The role of China will be critical. China has shown great leadership in applying innovation to development challenges. Given the size and scale of the opportunity for green technology applications in China, there is tremendous room to cooperate in areas such as carbon capture and sequestration, low-carbon material production, and design of eco-cities. Such successes will benefit both China and the world.”¹⁰⁸ Among the announced outcomes was a new UN Climate Change Partnership Framework to be launched by China involving nine UN agencies and over a dozen national partners to establish a common framework for policy and action.

At the global level, the United Nations Human Rights Council has considered the matter for several years. In its resolution on “human rights and climate change,” adopted by consensus on 25 March 2009, it affirmed “that human rights obligations and commitments have the potential to inform and strengthen international and national policy-making in the area of climate change, promoting policy coherence, legitimacy and sustainable outcomes.”¹⁰⁹ The panel discussion, which took place in June 2009 in response to resolution 10/4, did not raise explicitly the right to share in scientific progress although, in introducing the panel the Ms. Kyung-wha Kang, Deputy High Commissioner for Human Rights, noted, “The human rights perspective underlined the

¹⁰⁷ UNDP China, *Green technology—innovative solutions for climate change High-level Forum held to discuss future actions to combat climate change through technology innovation* (Apr. 25, 2008), available at <http://www.undp.org.cn/modules.php?op=modload&name=News&file=article&catid=14&topic=6&sid=4291&mode=thread&order=0&thold=0>.

¹⁰⁸ *Id.*

¹⁰⁹ U.N. HRC. Res. 10/4, preamble (Mar. 25, 2009).

need for international assistance and cooperation to address the unequal burden falling on those who are least able to carry its weight. This perspective also brought into focus how the adverse effects of climate change were not only felt by countries and economies, but also - and more fundamentally - by individuals and communities.”¹¹⁰ The burden is on individuals and communities, who in fact are the beneficiaries of the right in article 15(1)(b), the implementation of which requires the assistance to which Ms. Kyung-wha refers. One of those obligations and commitments is the sharing of scientific progress, which so far has not been part of the deliberations.

V. Conclusion

The right to share the benefits of science and technological advances sounded like a reasonable proposition to the great minds assembled in 1947 to reflect on what should go into the Universal Declaration of Human Rights. Basically, little has changed since Aldous Huxley and the other members of the UNESCO panel warned of the obstacles business and governments placed in the path of making scientific advances available to those who need to share in their benefits. Nevertheless, their voice was heard and this right has found its way in to the principal aspirational and legally binding human rights instruments adopted at the global and regional levels. However, it has been left there to languish as what is perhaps the most neglected right in the corpus of internationally recognized human rights.

¹¹⁰ Human Rights Council Panel Discussion on the Relationship between Climate Change and Human Rights, Summary of Discussions 1 (June 15, 2009), *available at* <http://www2.ohchr.org/english/issues/climatechange/consultation.htm>.

Reasons why it is neglected are not hard to find. If you scratch beneath the surface, it turns out that the proposition of sharing in these benefits as a human right of all is a rather revolutionary proposition, challenging the financial interests of major countries and corporations for whom access to these benefits should be submitted either to market forces or to the discretionary authority of states to provide concessionary support to technologically deprived countries at whatever level and whenever they wish. The concept of a human right suggests that the benefits should be available as soon as feasible in accordance with available resources and in preference to other legally protected interest, such as ownership in intellectual property.

Does this mean that inventions should not be protected by patents? The free functioning of the market with patent protection for inventors, including for corporations that manufacture and market products that are the result of advances in science and technology, is a necessary condition for scientific progress, even if it means that those who lack resources will not benefit and therefore the right to share in the benefits of scientific progress does not really belong to “everyone.” For this reason, politicians have tended to avoid the human rights perspective when dealing with transfer of technology. However, just like the right to health requires that rules protecting patents give way to the urgent needs of developing countries to respond to health emergencies, transfer of technology more broadly must be based on the right of people everywhere to benefit from scientific progress.

The experience with access to essential medicines has taught us that the pendulum can shift direction if and when social mobilization overrides business as usual and the HIV/AIDS crisis provided that momentum. The shift has been limited in the drugs field and TRIPS

flexibilities are available in theory but rarely used in practice. Similarly, the current crisis on climate change has mobilized resources for mitigation and adaptation, including significant commitments to transfer of technology. However, it is treated as enlightened self-interest or charity on the part of developed countries, or both, but not as a matter of a human right of the most vulnerable to climate change to benefit from green technologies in their own economies and from the duty of those who caused the problem in the first place to apply technology to clean it up. When hundreds of billions of dollars are at stake, governments are not going to acknowledge a formal and legally binding obligations. They will, however, engage in programs that effectively bring the benefits of scientific progress to those who lack the capacity to invent and apply scientific and technical knowledge to the problems they face.

Innovation in science and medicine depends on the creation of incentives to invest and to reap benefits from such investment. A distinction is needed between these legitimate interests and the equally legitimate moral claim that science and technology are part of the common heritage of humankind. The gains from commercial activity based on innovation in developed countries has proved to be more than adequate to allow the means to be put in place to give meaning to right to share the benefits of science and technological advances.

If the right to benefit from scientific progress is to be lifted out of obscurity it needs to fit the policy objectives of the major players. In the scientific community, the dissemination of results of research and education in science and technology are highly desirable. The problem is that the pressures on scientists to publish in peer reviewed publications, to obtain funding for research, and to be on panels of the most prestigious organizations, does not provide many inducements to involve

people in developing countries. Nor are there many incentives to bridge the gap between Finland, at the top, and the LDCs at the bottom of performance in science testing or even enrollment in science classes.

Therefore, the principle of a human right to benefit from scientific progress is easy to accept; allocating the resources and directing programs toward massive science education and transfer of technology have failed miserably to alter the current disparities. Until and unless these obstacles are overcome, the words of the Universal Declaration that “[e]veryone has the right freely ... to share in scientific advancement and its benefits” will remain hollow.