

Human Rights and Technology—A Conflictual Relationship? Assessing Private Research and the Right to Adequate Food

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Human rights provisions addressing technology have been much ignored. The connections between technology and human rights have, however, received renewed interest recently. Patent disputes, stagnation in publicly funded research, and the role of technology in meeting the Millennium Development Goals are three areas of substantial interest. After an analysis of the two main provisions on technology of the International Covenant on Economic, Social and Cultural Rights (ICESCR), Article 11.2(a) and Article 15.1(b), the relationship between technology and environment is analyzed. As also evidenced in two other treaties, the Convention on Biological Diversity and the International Treaty on Plant Genetic Resources for Food and Agriculture, there is no assumption of any conflict between technology and the environment. International cooperation for the realization of the right to food is widely acknowledged, and such cooperation also includes technological efforts to produce more high-yielding varieties. The article proves that there is a basis in human rights treaties, especially in the ICESCR, for serving as a guidance in the formulation and implementation of technology policies. The wording of the relevant paragraphs are, however, not of such a kind as to set out clear and unambiguous obligations.

Introduction

States' obligations relating to social human rights must take into account technology capacities and constraints. Regarding the right to adequate food, this is made explicit by the formulation of Article 11.2(a) of the International Covenant on Economic, Social and Cultural Rights (ICESCR). This paragraph says that States "shall take... measures which are needed to improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge." Moreover, the ICESCR recognizes in Article 15.1(b) "the right of everyone to... enjoy the benefits of scientific progress and its applications."

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The ICESCR is silent with regard to how the States organize their research in order to realize these rights and to meet their obligations. This is confirmed by the Committee on Economic, Social and Cultural Rights (CESCR): "in terms of economic and political systems, the Covenant is neutral" (CESCR 1991a: paragraph 8). In fact, the CESCR asserts that a State can help to realize the rights recognized in the Covenant by a "laissez-faire economy" (CESCR 1991a: paragraph 8), which must be understood that the State will leave at least parts of the research arena to the private sector.

At the same time, it must be asked whether it is advisable for States to leave the scientific field to private actors only. The role of the private sector is explicit in target 18 under the eight Millennium Development Goal: "In cooperation with the private sector, make available the benefits of new technologies." Will the private actors, whose primary motivation is profit maximization, ensure that such scientific progress and its applications will be enjoyed by everyone, in accordance with the terms of the ICESCR? The Millennium Project's two Task Forces, one on Science, Technology and Innovation and one on Hunger (United Nations Millennium Project 2005a and 2005b: 32–34, the latter referring explicitly to human rights provisions and subsequent clarifications) have contributed to clarify these important questions. Note also in this context that the International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD), a joint effort by seven UN bodies, finalized its three years collaborative work through an Intergovernmental Plenary Session in April 2008. The IAASTD builds, inter alia, on the UN Millennium Project Task Force on Hunger. While addressing several issues that will contribute to realization of the right to food, the reports did not refer explicitly to human rights obligations, only to the more general concepts of food security and food sovereignty. With some exceptions, however (Weeramantry 1990, 1998; Haugen 2005), there is a lack of analysis of these relationships that are embedded in human rights provisions and principles.

The article will analyze the relevant provisions of the ICESCR, in order to assess the scope of the legal obligations derived from the specific rights. It is acknowledged that the specific relationships between technology, science, and human rights is underresearched. There are, however, documents seeking to understand the complexities of these relationships.

First, a brief elaboration will be given on how these relationships has been addressed by the organs of United Nations during the last decades. Then, the relevant provisions on science and technology of the ICESCR will be elaborated, in two different sections. The article will then analyze relevant provisions addressing technology in two more recent treaties, both of which have food implications, the Convention on Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), as well as the provisions relating to natural resources in the ICESCR itself. Finally, as the ICESCR emphasize international cooperation, an analysis of international measures in the field of technology relating to food production will then be undertaken.

Elaborations by the United Nations on Human Rights and Science in the Context of Food

Ever since the adoption of the International Covenant on Economic, Social and Cultural Rights (ICESCR) in 1966, there have been ambiguities in the relationship between science and human rights. The drafting of the ICESCR, which mainly took place in the 1950s, represents a period with a positive assessment regarding this relationship. The paragraphs of the ICESCR that relate to science, as quoted in the introductory paragraph, view science in a positive, nonproblematic way.

Moreover, the drafting of the Constitution of the UN's Food and Agricultural Organisation (FAO) in 1965, resulted in a text for Article 1.2 where no less than three out of six paragraphs relate to the improved methods of food production (Food and Agricultural Organisation 1998). Article 1.2 (Functions of the Organization) addresses research, improved methods of agricultural production, and improvement of processing, respectively.¹ These amendments were made as a direct result of the wording of Article 11.2 of the ICESCR (Mechlem 2004: 647). The FAO Constitution, however, does not establish a stronger link between the "improved methods" and the "full use of technical and scientific progress" than what is already found in the Covenant.²

The 1970s and 1980s represent a period where science was seen as constituting a potential threat against human rights. Kubota (1990: 123) found that negative aspects of scientific and technological developments dominated UN studies conducted in the aftermath of the 1968 International Conference on Human Rights (United Nations 1968). To some extent, a 1983 resolution of the Commission on Human Rights represented a watershed, as it called on all actors to submit to the Secretary-General "on the most effective ways and means of using the results of scientific and technological developments for the promotion and realization of human rights and fundamental freedoms" (United Nations 1983).

Also the second World Conference on Human Rights in 1993 expressed concerns by noting 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" (United Nations 1993: paragraph 11).

The latter decade, however, has seen an increased acknowledgement of the contributions of science for the fulfillment of human rights, and also a recognition of the crucial role scientists can play in these endeavours (Claude 2002).

Regarding the relationships between science and human rights, the emphasis has been on the human rights implications of the research on the human body. This has led to the adoption of nonbinding documents; one example being the UNESCO Universal Declaration on the Human Genome and Human Rights. Documents seeking to bring greater clarity to this relationship have addressed wider issues, such as respect for the rights of indigenous peoples, including use of resources (United Nations 2007a: paragraph 11[2] [on intellectual property] and paragraph 26 [on resources]; see also United Nations 2002: paragraph 22[3] and United Nations 2001).

General Comment No. 12 on the right to adequate food (CESCR 2000a) is more relevant in the context of the right to adequate food, but it addresses issues relating to technology only in two paragraphs. First paragraph 25, elaborating on a national strategy for the right to adequate food, says that such strategy "should address critical issues and measures in regard to *all* aspects of the food system, including the production, processing, distribution, marketing and consumption of safe food." Second, paragraph 26 addresses the issue of "appropriate technology" in the context of nondiscrimination in access to food or resources for food. None of these clarifies the scope of neither rights nor obligations regarding science and technology in the context of food.

Another document, resulting from intergovernmental negotiations under the auspices of Food and Agricultural Organisation (FAO) is the Voluntary Guidelines to Support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security ("Voluntary Guidelines"—Food and Agricultural Organisation 2004). This comprehensive document addresses technology in Guideline 8 ("Access to resources and assets"). Two paragraphs are particularly relevant. First, Guideline 8.4 says (extracts): "States

should promote agricultural research and development, in particular to promote basic food production." Guideline 8.5 says (extracts): "States should . . . promote access by medium and small-scale farmers to research results enhancing food security." These are important principles, indicating the *purposes* of agricultural research. The nonbinding nature of these Voluntary Guidelines and the term *should* do not, however, outline strong legal obligations.

Reports from the United Nations Secretary-General have addressed wider issues relating to food and biotechnology, but without an explicit human rights basis (UN 2003). The Special Rapporteur on the right to adequate food addresses the role of biotechnology corporate actors (UN 2004: 14, paragraph 37 and 38), referring to "transgenic crops," "technologies that prevent seeds from regenerating" and "private appropriation of knowledge." The Special Rapporteur expresses concerns but does not analyze new biotechnology and the right to adequate food in an explicit manner. Moreover, recommendations such as "ensure that biofuel production is based on family agriculture, rather than agro-industrial methods" (UN 2007b: paragraph 64[e]) are specific but unable to contribute to a clearer understanding of both the rights and the corresponding obligations relating to food production and distribution.

Finally, in a study on science and human rights, commissioned by the Commission on Human Rights, there is an analysis of how science relates to human rights. Under the title "The Politics of Food," ten areas of concern relating to human rights and food technology are identified (Weeramantry 1990: 174–77):

1. Developing appropriate norms of intellectual property;
2. Developing countries' access to information systems managed by FAO;
3. Strengthening incentives to set up research institutions in developing countries;
4. Establishing regulation of food technology entering developing countries;
5. Developing local technological skills as part of international loan arrangements;
6. Investing more in improving food technology in developing countries;
7. Initiating land reform programs;
8. Rehabilitating environmentally degraded or mined-out land;
9. Spreading relevant technological knowledge relating to food and agriculture;
10. Considering knowledge, science, and technology as a universal inheritance.

Together, these areas identify several fields in which measures can be taken in order to realize the right to food. Among them, five are related to making use of technological and scientific knowledge.³ None of the areas, however, are explicitly addressing the "*full use* of technical and scientific knowledge" (*italics added*), as stated in Article 11.2(a) of the ICESCR.

As a conclusion based on a review of these different documents, it is only the 1965 revision of the FAO Constitution and to a lesser extent the 2004 Voluntary Guidelines that represents legal documents that represents elaborations on scientific knowledge relating to food production, but without shedding light on the wording of Article 11.2(a) of the ICESCR.

Scientific Knowledge and the Right to Adequate Food (Article 11 ICESCR)

Alston (1984: 35) has identified three objectives and three measures of Article 11.2(a).⁴ The three objectives are: to improve methods of food production; to improve methods of food conservation; and to improve methods of food distribution. All of these objectives are obviously important, and the relationship between food production and food distribution are crucial for the realization of the right to adequate food, as food can be produced in increased quantities, but without becoming more accessible to starving populations. Simply measuring higher yields does not *necessarily* indicate better realization of the right to food.

In addition, the following *measures* are identified: making full use of technical and scientific progress; disseminating knowledge of the principles of nutrition; and developing or reforming agrarian systems. Of these, the current article will analyze the first of these measures, namely how the obligation to take measures to make full use of technical and scientific progress affects the enjoyment of the human right to adequate food.

These measures and objectives will be analyzed with regard to the most vulnerable and food insecure, in accordance with paragraph 13(b) of General Comment No. 12 (CESCR 2000a).⁵ An analysis of measures to make full use of technical and scientific progress relating to the objective “improved methods for the production of food,” will be followed by a similar analysis relating to the objective “improved methods for the distribution of food.”

FAO estimates that cereal production globally must increase from the current two billion tons to three billion tons by 2030 (Food and Agricultural Organisation 2003). This further illuminates the relevant objective from the ICESCR on “improved methods for the production of food,” which must primarily be understood as *increased* food production.

As found above, the explicit wording of Article 11.2(a) (“making full use”) is not repeated in any other legal or analytical document. Hence, it seems that science (“technical and scientific knowledge”) is given a particularly strong emphasis in the ICESCR.

Turning to the measure “making full use of technical and scientific knowledge,” the wording does *not* indicate that the State parties to the ICESCR must produce the knowledge themselves, only that they shall make full use of the knowledge. This is also in line with the understanding in the FAO Constitution paragraph 1.2(b) that knowledge of agricultural science shall be public and its spread shall be promoted.

At the same time, this strong relationship between the objective (“improved methods”) and the measure (“making full use of technical and scientific knowledge”) of Article 11.2(a) raises the question of whether there is an obligation under the ICESCR to *conduct* agricultural research for the purpose of contributing to a better realization of the right to food.

On the one hand, the terms “method” and “knowledge” are interpreted to imply that there already exists certain common knowledge related to specific methods. The obligation on States must be to facilitate the best use of these methods for the realization of the right to food.

On the other hand, there are three possible arguments in the ICESCR itself for why States cannot only be *using* the knowledge but must also take steps towards *producing* such knowledge. First, the objective of improving methods of food production of Article 11.2(a) addresses the State parties specifically. Second, Article 15.1(b) on the “right of everyone to enjoy the benefits of scientific progress and its applications” (see section 4 below), implies that the State cannot remain passive, acting only as a receiver, in its scientific policy. Third, the general obligation of Article 2.1 asserts that States shall make use of “all appropriate means” and allocate “the maximum of its available resources.”⁶

Based on these provisions, the mere *use* of knowledge cannot be considered as sufficient; the State parties must also *produce* such knowledge in order to meet their obligations under the ICESCR. How far this obligation to conduct research (research obligation) extends, however, is determined by the available resources of the State, as well as whether the State finds, after close consideration, that there are other measures that are more appropriate under the circumstances. The importance of international cooperation is also crucial in this context, as will be analyzed further in “International Cooperation and Assistance” below.⁷

The understanding of the State obligations can be clearer by applying the widely recognized approach on the three levels of human rights obligations. On the respect level, the obligation is to avoid interfering in people and communities’ own efforts to improve agricultural methods: “The obligation to respect requires the State... to abstain from doing

anything that violates the integrity of the individual or infringes on her or his freedom, including the freedom to use the material resources available to that individual” (Eide 1987: 14). With regard to the protect level, the State has an obligation to protect everyone—not only the users of the products from science—from harm. The State must regulate research in order to prevent conduct of research that might threaten the public interests. On the fulfill level, this is somewhat more complex. The State should—as a minimum—*facilitate* innovative activities. As noted by an author, “the provision would appear to require, at minimum, the institution of national education and training programmes and research to engender the effective utilization of existing expertise” (Craven 1995: 321). That the State should both facilitate or foster research is a reasonable interpretation of the term “improve methods of production.”

One can go a step further and ask whether the research should be *undertaken* by public institutions. As the research capacities and priorities differ between the State parties to the ICESCR, it cannot be presumed that the ICESCR implies that publicly undertaken research shall always be preferred over various forms of privately undertaken research. Moreover, any public intervention in the area of science must take into account the obligation of Article 15.3 of the ICESCR “to respect the freedom indispensable for scientific research and creative activity.” State interference in scientific research is hence not allowed, except from those situations where this freedom indispensable for research is associated with activities that threaten human rights. A legal basis for possible State restrictions is found in Article 5.1 of the ICESCR, which is an “abuse of human rights” provision, prohibiting activities “aimed at the destruction of any of the rights or freedoms” recognized in the ICESCR.

The obligation to ensure that the research is undertaken, and that this results in improvements of the human rights situation, however, is with the State. As will become clearer in “The Right to Benefit from Scientific Progress and its Applications (Article 15 ICESCR)” below, the State cannot leave all research efforts to the private sector, as this will result in satisfaction of certain interests, most notably the interests of those with the ability to pay. The efforts of the State must, as a minimum, be directed to the type of research that will benefit those without the ability to pay for the products resulting from the privately undertaken research.

In order to give more clarity to the general, and somewhat confusing first part of Article 11.2(a), an assessment of the tools developed by the Committee (CESCR) is required. The Guidelines for State reporting (CESCR 1991b) lists relevant aspects to be considered under each of the rights recognized in the ICESCR.

The Guidelines are rather scarce, however, on the content of Article 11.2, reading:

Please indicate in what ways measures taken to improve methods of production, conservation and distribution of food by making full use of scientific and technical knowledge have contributed towards, or have impeded the realization of the right to adequate food. (CESCR 1991b: Article 11, paragraph 2(e)—extracts)

While the first part of this paragraph in the Guidelines repeats the wording of Article 11.2(a), the latter part of the paragraph introduces two terms, “contribute towards” and “impede.” The CESCR, in its Guidelines, seems to acknowledge that under certain circumstances “full use of scientific and technical knowledge” *can* also impede realization of the right to adequate food. The Committee does not give any guidance with regard to identifying these circumstances.

By interpreting the terms of the ICESCR, there is nothing that seems to justify that the drafters believed that the measures applied can actually *impede* the realization of the

right to food. Rather, the drafters of the ICESCR must be presumed to believe that to make full use of technological and scientific knowledge would contribute to the realization of the right to food, and not serve as an impediment.

In the 50 years that have passed since the ICESCR was drafted, technology is no longer seen as a panacea. As noted by an author, studying the relationship between technology and human rights: "Earlier approaches tended to view the problem [of hunger] as one of increasing the production and supply of food. . . However, it is being increasingly realized today that, while technology is a prime requirement for this task, technology cannot function alone" (Weeramantry 1998: 196). While this shift in perceptions of technology must be acknowledged, this does *not* imply that the general obligation regarding scientific and technical knowledge is weakened.

The analysis will now turn to the objective "improved methods of food distribution." More specifically, it will be examined whether improved food production might adversely affect improved food distribution. In General Comment No. 12 (CESCR 2000a) both availability and accessibility constitute the core content of the right to food. Increased food production does not contribute to better realization of the right to food unless there is also an improved distribution of this extra food. Regarding economic accessibility, General Comment No. 12 merely addresses "acquisition patterns or entitlements through which people procure their food" (CESCR 2000a: paragraph 13).

Increased production per se is not sufficient. As noted in the first comprehensive UN study on the right to food, the crucial test is whether the individual has an adequate "command" over food (Eide 1987: 27). This approach is close to the term "entitlement" introduced by Amartya Sen, emphasizing "the ability of people to command food through the legal means available in society, including the use of production possibilities, trade opportunities, entitlements vis-à-vis the state, and other methods of acquiring food" (Sen 1981: 45). Sen underlines that the crucial issue is not whether there is enough food but whether people are having enough to eat (Sen 1981: 1).

Concerning the introduction of new technologies, members of local farming communities have highly different attitudes and responses, and different factors affect the responses in different contexts. It is beyond the scope of this article to identify in detail all consequences and responses involved in the introduction of new technology, including modern forms of biotechnology, in agriculture.

Research efforts undertaken by commercial actors, who charge a high price when the products from the research are introduced on the market, can be potentially problematic from a human rights perspective, in line with economic accessibility. Effective patent and plant variety protection could lead to increased private agricultural research efforts—on certain crops. It must be presumed that farmers purchasing such new biotechnology are acting rationally, provided that they have adequate information. Public efforts to ensure such information are crucial.

Some authors observe that the private sector is more efficient than the public sector in actually delivering the products resulting from the research (Dalrymple and Srivastava 1994: 204; Louwaars et al. 2005). All farmers need to exchange their seeds, and the frequency of this seed exchange impacts the yield, as the seeds gradually lose their qualities. The actual costs of such provision should not be ignored, however. In a human rights context, improved methods for both production (and conservation) has limited value, unless this also affects positively the actual provision of food to the most food insecure, who have limited financial resources to purchase food.

General Comment No. 12 (CESCR 2000a) addresses the role of the private sector in paragraph 20 ("respect of the right to adequate food") and 27 ("ensure that activities of the

private business sector and civil society are in conformity with the right to food"), but neither include references to privately undertaken research. Therefore, when General Comment No. 12 addresses the private business sector, this is done in somewhat vague terms.

Potential positive effects on production of food by making full use of technical and scientific knowledge must be balanced against the potential negative impact on food distribution or access to food. This also seems to be underlying the term "impede" as applied in the Guidelines. The full use of technical and scientific knowledge could have certain distributional impacts (production capacity), which will be different among small holders and holders of larger farms, as well as between poor and rich. A comprehensive volume analyzing the impact of the introduction of new seeds, in the aftermath of the "Green Revolution," concludes positively on the gains in productivity but expresses somewhat stronger reservations on the gains on distribution. Evenson and Rosengrant (2003: 496) conclude that crop genetic improvement gains "were not realized evenly by any means. Nor were they sufficient to bring about 'convergence' in per capita incomes between developing and developed countries."

The wording of Article 11.2(a) of the ICESCR implies that measures relating to technology and agricultural science cannot be ignored. The crucial question that the State should ask itself is how to facilitate the production process so that the production of food is shared more equally between holders of large farms and small holders. Merely distributing food *when it has been produced* is a more inefficient strategy. In this context, it must be observed that, according to the United Nations Millennium Project (2005a: 31) "agricultural research . . . directly contribute to growth and development."

The Right to Benefit from Scientific Progress and its Applications (Article 15 ICESCR)

Article 15.1(b) of the ICESCR recognizes "the right of everyone to . . . enjoy the benefits of scientific progress and its applications." New forms of biotechnology must be considered to fall under the general phrase "scientific progress and its applications."

There was for many years an almost total ignorance regarding the rights recognized in Article 15. An illustration can be found in a document by the UN Secretary-General to the Commission on Human Rights. Previously, there had been discussions whether Article 15 should be excluded from the rights covered by a possible "optional protocol" to the ICESCR, allowing for an individual complaints mechanism. The Optional Protocol to the International Covenant on Economic, Social and Cultural Rights has been adopted by the Human Rights Council as A/HRC/RES/8/2, Annex, and will—according to the schedule—be adopted by the UN General Assembly on 10 December 2008. The document from the Secretary-General, however, observed that "it would be difficult to single [Article 15] out for exclusion while retaining other formulations of equivalent generality" (United Nations 1997: 8, paragraph 24). There are no recent attempts of ascribing a secondary nature to the rights recognized in Article 15.

From 2000 onwards, the CESCR has facilitated discussions on Article 15, in particular 15.1(c) on the rights of authors,⁸ resulting in General Comment No. 17 on Article 15.1(c) (CESCR 2005). While this article will not analyze Article 15.1(c) in detail (see Helfer 2007 and Haugen 2007), the relationship between the different parts of Article 15 must be "mutually reinforcing and reciprocally limitative" (CESCR 2005: paragraph 4). This implies that the rights to enjoy benefits of scientific progress and its applications as recognized in Article 15.1(b) cannot be enjoyed to the extent that the human rights of authors, as recognized in

in Article 15.1(c), are ignored. At the same time, it is possible to see intellectual property rights as supporting rights for the enjoyment of human rights.⁹

The potential conflicts between Article 15.1(b) and Article 15.1(c) were not subject to much attention during the negotiations. The balance between the two rights in the negotiations of Article 27 of the Universal Declaration was raised, however, by one delegation: "The concept of the protection of intellectual work conflicted to a certain extent with that of freedom of access to all literary, artistic or scientific output" (United Nations 1948: 632). We see that already in the early phase of the negotiations, the issue of *access* was addressed.

Article 15.1(b) is further strengthened by the other provisions of Article 15 of the ICESCR. Phrases such as "diffusion of science" (15.2; see below) and "international contacts and co-operation in the scientific fields" (15.4; see section "International Cooperation and Assistance" below) must both be understood to contribute positively towards the right to benefit from scientific progress and its applications.

An analysis of the content of Article 15.1(b) will now be undertaken. The right recognized in Article 15.1(b) is particularly interesting as it has a direct relationship to the objective of improved methods of food production in Article 11.2(a). An obligation to improve methods of production of food by making full use of technical and scientific knowledge relates to how the production shall be increased. The right to enjoy the benefits of scientific progress is related to how the direct and indirect results of science are made available to everyone. Both the obligation to take measures to make full use of technical and scientific knowledge, and the right to enjoy the benefits of scientific progress, express a generally positive view on science and its applications.

Enjoy the benefits of scientific progress: The term "benefits" must be understood as material benefits, which every person should enjoy in everyday life. This scientific progress was expected to be distributed to everyone, if the right conditions were provided. The "trickle-down" effect would provide for both the international and national dissemination of new technology and wealth. This right naturally applies to everyone, and there is no requirement that one has actually contributed to this progress.

The *travaux préparatoires* confirm this interpretation. An issue that was brought up in the discussions during the General Assembly related to the terms "participate" and "share." It was generally agreed that participation was more active, but that such participation could not be expected from everyone. The solution was to introduce the phrase "and its benefits" at the end of this paragraph (United Nations 1948: 627). This would make it clear that not everyone could be expected to participate, but that everyone should have the right to share in the benefits of scientific advancement.

Enjoy the benefits of applications of scientific progress: Not only shall the information about new science be made available but also *applications* of this science shall be made available, hence also identifying State obligations *beyond* merely providing information about scientific progress. Oxford dictionaries define "applications" either as "substance used" (Oxford's Advanced Learner's Dictionary of Current English 1974) or "practical use" (The New Oxford Dictionary of English 2001).

Kloppenborg defines science "as a process of linking knowledge and application" (Kloppenborg 1988: 45). He furthermore claims: "We cannot understand science without a reference to the commodity" (Kloppenborg 1988: 45). He therefore seems to understand the term "applications" as being similar to "commodities." The United Nations Millennium Project (2005a: 15) defines "new technologies" as "applications in new areas." This confirms that "applications" can be understood as being similar to "commodities" or at least similar to "products."

The State has *primarily* obligations relating to information. To analyze if there are situations in which the State obligation extends beyond this, and in order to have a better

understanding of the scope and limitations of Article 15.1(b), the analysis will make use of the three levels of State obligations, namely to respect, to protect, and to fulfill (facilitate and provide).

Regarding the obligations to *respect*, any action by the State party that negatively impacts on the human right to enjoy the benefits from scientific progress and its applications acts contrary to the obligation to respect. Science is disseminated by forces operating outside of the State organs. The Guidelines on State reporting addresses such interferences, by calling upon States to "provide information on . . . any restrictions which are placed upon the exercise of this right, with details of the legal provisions prescribing such restrictions" (CESCR 1991b: Article 15, paragraph 2d). Through this formulation, the CESCR states that if there shall be *any* restrictions of the right recognized in Article 15.1(b), such restrictions must have been subject to conscious considerations before being implemented. In the process leading up to the adoption of a law, such considerations are made possible.

With regard to the obligation to *protect*, the most reasonable understanding of State obligations is that there must be laws and mechanisms in place to prevent harmful or dangerous use of scientific progress (United Nations 1993: paragraph 11). There are no provisions in Article 15 that explicitly address the obligation to protect in relation to scientific activities. The Guidelines for State reporting do, however, address this, by requiring States to "provide information on . . . measures taken to prevent the use of scientific and technical progress for purposes which are contrary to the enjoyment of all human rights" (CESCR 1991b: Article 15, paragraph 2c). This paragraph does not use the term *protect*. The phrase "prevent the use," however, must be considered to fall under the obligation to *protect*. Also States can be involved in "use of scientific and technical progress for purposes which are contrary to the enjoyment of all human rights." Hence, this paragraph also indicates an obligation on the level of *respect*. The concern is to avoid harm resulting from the use of scientific and technical progress that adversely affects the enjoyment of human rights, irrespective of whether private actors or States are involved.

Finally, regarding the obligation to *fulfill*, Article 15.1(b) is relatively weak in identifying obligations on the *fulfill* level. The core content of Article 15.1(b) is that at least information on scientific progress and its application shall be *made available*. Moreover, the State must identify whether there are any factors that prevent the actual exercise of this right. The obligation to fulfill (*facilitate*) implies that the State must seek to remove these obstacles that prevent the full enjoyment of this right. Other paragraphs of Article 15 elaborate on State obligations, primarily Article 15.2.¹⁰ This paragraph applies the phrase "steps to be taken," hence repeating the general provision of Article 2.1 (see endnote 6). Furthermore, the terms "full realization" and "necessary for" give rather strong directions but do leave to the State organs a margin of discretion to determine when the measures are "necessary."

The Guidelines on State reporting will also here be included in the analysis. The relevant paragraphs read:

provide information on . . . a) measures taken to ensure the application of scientific progress for the benefit of everyone, including measures aimed at the preservation of mankind's natural heritage and at promoting a healthy and pure environment and information on the institutional infrastructure established for that purpose; b) measures taken to promote the diffusion of information on scientific progress. (CESCR 1991b: Article 15, paragraph 2)

These two subparagraphs are emphasizing the provision of information. Therefore, on the fulfill (facilitate) level, the State seems able to determine, by a rather wide margin of discretion, how the right recognized in Article 15.1(b) best shall be realized.

The fulfill (*provide*) level will now be examined. While the provision of information on scientific progress is important also at this level, it should be asked whether there are certain *products* resulting from scientific progress that are crucial in order to realize a recognized right. Among the various rights recognized in the Covenant, the availability of products resulting from scientific progress must be considered crucial in relation to the right to the highest attainable standard of health and the right to adequate food. In the respective general comments (CESCR 2000b and CESCR 2000a), there is a general trend toward provisions of “products” not only “information about products” as a part of the State obligations. Furthermore, General Comment No. 3 on the nature of States’ obligations asserts that a State that does not utilize its own resources, or resources made available through international cooperation, in a situation with consistent threats toward human life because of an epidemic or pandemic, to provide products resulting from scientific progress, such as medicines, seeds or food-stuff, can generally not be said to be acting in conformity with its human rights obligations (CESCR 1991a). In *these* situations—where actual access to specific products is of crucial importance for the enjoyment of human rights as the right to food or health—the mere *information* about relevant scientific progress is not sufficient; *products* resulting from this scientific progress must also be made available. In this context, the Doha Declaration on the TRIPS Agreement and Public Health,¹¹ saying in paragraph 5(c) that “Each Member has the right to determine what constitutes a national emergency or other circumstances of extreme urgency” is worth mentioning.

It is acknowledged that this is an interpretation that goes beyond both the wording of the ICESCR itself, as well as the Guidelines for State reporting. Based on the object and purpose of the ICESCR, as well as the urgency involved for those who are suffering under lack of access to crucial lifesaving goods produced by means of science, these obligations on the State must be recognized. The amount of available resources, including resources made available by actively seeking international assistance and cooperation (see section “International Cooperation and Assistance” below), will determine when the State does not act in conformity with its obligations.

It must be acknowledged, however, that the obligations imposed by Article 15.1(b) are weaker than the obligations imposed by Article 11.2(a), simply because the wording of Article 15.1(b) is vague. It is only by reading it in the context of other paragraphs of Article 15, as well as Article 2.1 of the ICESCR (see endnote 6) that the scope of its obligations will be clear.

At the same time, the emphasis on the human rights of everyone to enjoy the benefits of scientific progress and its applications is a basis for research policies. More specifically, does a State, which has stagnated in its research investment, but at the same time facilitates increased research investments by private actors, act in compliance with the Covenant? Kloppenburg (1988: 280) argues that publicly funded actors must seek also to deliver the products, hence operating as real competitors to the private sector, especially in the context of the increased commodification of seeds.

This is a difficult question to answer. While the role of the private companies implies that there might be an increased amount of scientific progress, compared with a situation where the State directs the research, it is also a relevant factor whether this research is benefitting those most marginalized and vulnerable, who might be in particular need for special public efforts in order to enjoy their human rights. At the same time, the poor are not of great interest for the private sector, as they are not able to buy the products. The private sector will have limited interests in investing in production in which the rate of return is low.

Other concerns relating to sustainable use of both biological resources and genetic resources can be raised in the context of increased private involvement in agricultural research. The two next sections will analyze these concerns.

Emphasis on Science and Technology in Two Related Conventions

Recently, two relevant treaties relating to food and biological resources have been adopted. First, in 1992, the The Convention on Biological Diversity (CBD) defines its three objectives in paragraph 1 as “the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.”

In 2001, the The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) was adopted. The basis for starting negotiations on this treaty was given in Resolution 3 of the of the Nairobi Final Act on the Adoption of the Convention on Biological Diversity where paragraph 4 “recognizes the need to seek solution to outstanding matter concerning plant genetic resources” (United Nations Environmental Programme 1992). The ITPGRFA, representing this solution, reiterates in Article 1.1 the objectives on the CBD, only replacing the phrase “biological diversity” with the phrase “plant genetic resources for food and agriculture.” Article 1.2 of the ITPGRFA says that these objectives will be attained by closely linking it to the FAO and the CBD.

These two treaties are hence regulating *conservation*, *sustainable use*, and the *sharing of benefits* arising out of such use. All these objectives are considered as being important for the realization of the right to food.

In order to identify current treaties’ emphasis on science and technology, the article will now analyze the extent to which these two treaties recognize such research efforts as part of the solution to meeting the objectives and effectively implementing the provisions of these treaties.

First, the CBD includes several provisions on technology. The following phrases appear: “encourage research,” “access to and transfer of technology,” “technical and scientific cooperation,” “development and use of technologies,” and “effective participation in biotechnological research activities.”¹²

Second, the ITPGRFA is even more specific regarding the role of research in the use of resources and contains provisions on “development of appropriate technologies,” “strengthening research,” “promoting plant breeding efforts,” and “reviewing breeding strategies.”¹³ These provisions acknowledge the use of scientific and technical knowledge, also in the context of cooperation between industrialized and developing States, for the *conservation* and *development* of plant genetic resources for food and agriculture. Hence, the importance of science, in the context of international cooperation, is explicitly acknowledged in both the CBD and the ITPGRFA.

It must be observed that while there are several provisions that include national and international measures relating to science and technology, neither the CBD nor the ITPGRFA have equally strong and explicit wording as Article 11.2(a) of the Covenant (“making full use of technical and scientific progress”). Both CBD and ITPGRFA, however, confirm that science is relevant to implement a substantial number of treaty provisions.

The Relationship between Food, Technology and the Environment in the ICESCR

Based on this acknowledgement that science and technology is recognized within treaties that primarily regulate conservation, the article will now turn to the provisions of the

ICESCR that relate to natural resources, which is particularly important for poor people and their livelihoods (United Nations Millennium Project 2005b: 66; see also 70 and 173–177). While the right to health, as recognized by the ICESCR, includes a provision applying the term “environmental” explicitly,¹⁴ that obviously might relate also to the right to adequate food, this right-to-health provision will not be analyzed in this section on natural resources. The provisions relating to natural resources are found in different parts of the ICESCR.

First, Article 11.2(a) ends with the phrase “in such a way as to achieve the most efficient development and utilization of natural resources.” This latter part of the paragraph must be understood to apply to the whole paragraph, and not only to the last part of it. Development and utilization of natural resources is a prerequisite for food production.

Second, Article 1.2 states (extracts): “All peoples may, for their own ends, freely dispose of their natural wealth and resources.”¹⁵ This right of peoples is repeated in Article 25 of the ICESCR: “Nothing in the present Covenant shall be interpreted as impairing the inherent right of all peoples to enjoy and utilize fully and freely their natural wealth and resources.”

Third, Article 2.1 (see endnote 6) addresses “available resources.” These resources cannot be defined narrowly. Natural resources belong to the available resources of a State.

The main emphasis in this section will be on the latter part of Article 11.2(a), as understood within the context of Article 1.2, which reads: “All peoples may, for their own ends, freely dispose of their natural wealth and resources . . . In no case may a people be deprived of its own means of subsistence.” The Human Rights Committee has adopted a general comment on the right to self-determination, which reads: “The right of self-determination is of particular importance because its realization is an essential condition for the effective guarantee and observance of individual human rights and for the promotion and strengthening of those rights” (Human Rights Committee 1984: paragraph 1).

The analysis seeks to explore the relationship between increased use of new technology in *food production* (improved methods of food production) and the underlying objective of “efficient development and utilization of natural resources.”

How shall the phrase “efficient development and utilization of natural resources” be understood? Not much help is provided in the only UN documents on the relationships between human rights and the environment, the 1994 report to the Sub-Commission. A section on food was included in this report (Ksentini 1994: paragraphs 188–191), linking food “to an environment free from degradation.” The relevant paragraph on resource conservation in the annexed “Draft principles on human rights and the environment” is, however, very general: “All persons have the right to protection and preservation of the air, soil, water, sea-ice, flora and fauna, and the essential processes and areas necessary to maintain biological diversity and ecosystems” (Ksentini 1994: Annex 1, paragraph 6). This paragraph confirms an environmental objective, which indicates that the terms of Article 11.2(a) must be understood in light of developments during the last decades. A more elaborate interpretation is necessary, however.

On the one hand, particularly the term “utilize” could be understood to emphasize *using* at the expense of *conserving*. On the other hand, a reading and application of this latter part of Article 11.2(a) of the ICESCR based on the principle of intertemporal law¹⁶ this wording is embedded in the principle of sustainability. This notion did not exist in relationship to environment when the ICESCR was drafted in the 1950s and 1960s. Therefore, a proper understanding of the phrase “efficient development and utilization of natural resources” must take into account the current understanding of the balance between science, technology, and environment, and not the understanding prevailing in the 1960s.

According to the *New Oxford Dictionary of English 2001* “utilize” means “make practical and effective use of.” The term “effective use” is particularly interesting. Could an

“effective use” come in conflict with a “sustainable use,” in which resources must be conserved and maintained also for the use of future generations? It is necessary to understand the phrase “efficient development and utilization of natural resources” in the context of the right of everyone to be free from hunger. Any interpretation must be consistent with this right. Therefore, the phrase “efficient utilization” must be interpreted as using the natural resource base only to the extent that this does not come on the expense of the quality of the natural resource base for coming generations.

This understanding is confirmed by General Comment No. 12 and the Guidelines for State reporting. First, General Comment No. 12 includes sustainability of food both as a title in the section elaborating the core content of the right to food, as well as an element in the accessibility of food (CESCR 2000: paragraph 8) and identifies sustainability again in the context of a national food strategy (CESCR 2000: paragraph 25).

Second, the Guidelines for State reporting states:

Please indicate in what ways measures taken to improve methods of production, conservation and distribution of food by making full use of scientific and technical knowledge have contributed towards, or have impeded the realization of the right to adequate food. *Please describe the impact of these measures in terms of ecological sustainability and the protection and conservation of food producing resources.* (CESCR 1990b: Article 11, paragraph 2(e)–italics added)

These two documents from the CESCR confirm changes that have taken place from the 1950s and 1960s until present. Environmental concern plays a greater role in all aspects of public life. Of particular relevance for the purpose of this thesis is the erosion of plant biodiversity, and FAO identifies replacement of traditional varieties with modern, high-yielding and uniform varieties as the single most important factor for this erosion (Food and Agricultural Organisation 1996).

While the Guidelines for State reporting applies the term “impact,” Article 11.2(a) does not directly use the term “impact,” but the phrase “in such a way as to achieve” has similar connotations. The phrase “describe the impact” applied in the Guidelines must be interpreted as to imply that the impact can be quantified and measured. On the other hand, Article 11.2(a) of the ICESCR, as well as the relevant paragraphs of the General Comment No. 12 emphasizes the *considerations* that should guide the taking of measures.

The requirement of the Guidelines that the State parties should “describe the impact” goes beyond what is implied in the terms of Article 11.2(a). A more appropriate requirement would be that the State parties should describe how they have sought to protect and to conserve food-producing resources when taking the appropriate measures in the field of improved methods for, *inter alia*, the production of food.

The balance between introducing biotechnology, ensuring sustainability, and preserving natural resources and biodiversity is complex. FAO points to some concerns: “Biotechnology may reduce genetic diversity indirectly by displacing landraces and their inherent diversity as farmers adopt genetically uniform varieties of plants and other organisms. At the same time it increases the potential to preserve and sustainably use diversity” (Food and Agricultural Organisation 1999: paragraph 41).

Moreover, from a human rights perspective, the crucial issue is not on conservation of food-producing resources seen in isolation but rather how the resource-poor farmers are participating in the process of developing new plants and plant varieties, based on respect for ecological constraints (Eide 1987: 35 see also United Nations Millennium Project 2005a:

43, emphasizing the convergence between modern and traditional knowledge). It is expected that if such participation takes place, this would be an important prerequisite for a utilization of food-producing resources that does not deplete these resources. The International Fund for Agricultural Development (IFAD) states in a chapter titled "Technology, Natural Resources and Rural Poverty Reduction" that "unless the poor have the power to participate in deciding which technology to use, they are unlikely to benefit from it" (International Fund for Agricultural Development 2001: 127).

Therefore, Article 11.2(a) must be read to imply that measures must be taken to make full use of technical and scientific knowledge only to the extent that such measures do not adversely affect the conservation of food-producing resources. Improved methods of production, by making full use of technical and scientific knowledge, shall be assessed by taking into account two concerns. First, whether such methods have contributed to or impeded the realization of the right to food. Second, whether such methods have contributed to the development and utilization of natural resources in a way that preserve both the natural means of subsistence, as well as the ecological sustainability—crucial for the future realization of the right to food.

New circumstances, with new technological opportunities and challenges, warrant increased emphasis on what the ICESCR actually says. The CESCR has not adequately responded to these new challenges. In the Guidelines on State reporting (CESCR 1990b), the CESCR includes potentials and concerns relating to the introduction of new biotechnologies in the field of food and agriculture but does actually extend the obligations beyond what is justified by the wording. There are, however, increased concerns regarding biotechnology (United Nations Millennium Project 2005a: 175). General Comment No. 12 (CESCR 2000a) does not raise these concerns comprehensively and is too general to be of much help.

International Cooperation and Assistance

There are also several articles of the ICESCR that address international cooperation and assistance. First, Article 2.1 says that the State parties "undertakes to take steps, individually and through international assistance and co-operation, especially economic and technical." Second, there are three paragraphs in Part III of the ICESCR (Articles 6 through 15) that address international cooperation. All of them (Articles 11.1, 11.2[a] and 15.4) relate to the right to food and the right to enjoy scientific benefits. Third, among the several provisions of Part IV regulating international cooperation in the monitoring of the ICESCR, Article 23, addressing "the furnishing of technical assistance . . . for the achievement of the rights recognized" stands out from the other provisions. Technical assistance must be understood to represent more than merely technical cooperation programs of the UN High Commissioner for Human Rights (Alfredsson 2001: 475). The term "technical" of Article 2.1 of the ICESCR (see endnote 6) must therefore be given a comprehensive scope.

There is no doubt that many developing States are not able to make huge investments in agricultural science. Without elaborating in detail on the different forms of international cooperation and assistance, it is obvious that the Future Harvest Centers represents important resources in order to facilitate for the realization of the right to food but are underfunded and have not devoted sufficient attention to poor peoples' crops (United Nations Millennium Development Project 2005b: 65, see also 95–96 and 116). These Centers, which have entered into relationships with FAO, but which are formally independent, are involved both in technical support, and in making recommendations relating to

their specific area of competence, namely conservation and improvement of plant genetic resources.

In the context of these Centers' mandate to give advice on plant genetic resources in order to contribute to the realization of the right to food, an interesting perspective is presented in a report from the so-called Consultative Group on International Agricultural Research (CGIAR), which is an alliance between the Future Harvest Centers. In the context of presenting recommendations on access to new research undertaken at the different Centers, it is stated that this recommendation is "based on the premise that access to the means of food production is as much a human right as access to food" (CGIAR 1998, Ex. Summary, p. ix).

Three observations can be drawn from this. First, the drafters of the report did not consider there to be a conflict between patenting and access to seeds. Second, the understanding that "access to means of food production is a human right" is an understanding that does not find resonance in human rights treaties. Such access, however, is an important precondition. This view must be considered to be a private view of the drafters of the report, and is too focused on the production aspect, ignoring the actual food consumption. Third, the views expressed regarding the importance of access to the means of food production are valuable and should hence be endorsed.

Therefore, emphasizing measures of increased food production and conservation, it must be concluded that the CGIAR—in accordance with Article 11.2—constitutes an important form for international cooperation for the realization of the right to food, by promoting access to genetic resources for food and agriculture. The wording of Article 11.2, as well as Article 2.1 of the ICESCR, implies that measures can be taken individually or through international cooperation. At the same time, while international measures leading to improved methods of food production are important, a State cannot refrain from taking measures on the national level due to the existence of international institutions.

Finally, it must be observed that CGIAR's Mission is to contribute to food security and poverty eradication. Already in 1990, however, natural resource management became a twin pillar of the CGIAR's research; the other being increased productivity. Regarding overall international agricultural research, the richest countries now "seem unlikely to provide the quantities of productivity-enhancing technology . . . that they did in the past" (Pardey et al. 2006a: 5; see also Pardey et al. 2006b).

There are many and conflicting interests concerning what shall be the actual outcome of the activities of the CGIAR system. These conflicts must be presumed to be larger in the present context of the "gene revolution" with the active involvement of private research, depending upon intellectual property protection, and the emphasis on the public goods nature of the research at the CGIAR centers.

Conclusion

The article has sought to demonstrate that there is a basis in human rights treaties, especially in the ICESCR, for serving as a guidance in the formulation and implementation of technology policies. Such guidance applies with regard to how to serve the most vulnerable and marginalized, especially in order to identify a balance between the rights recognized in Article 15.1(b) (the human rights of everyone to benefit from science) and Article 15.1(c) (the human rights of authors to benefit from one's scientific production), where the latter has recently undergone an extensive clarification, by the means of a general comment (CESCR (2005), analyzed by Haugen (2007) and Helfer (2007)).

It is furthermore important to observe that the ICESCR recognizes environmental concerns, both in the context of peoples' rights over their natural resources, and in the context of measures taken for the realization of the right to be free from hunger. Moreover, the fact that the ICESCR is very explicit on international cooperation in those articles regulating food and science must be acknowledged.

At the same time, the wording of the relevant paragraphs are not of such a kind as to set out clear and unambiguous obligations. Rather, the relevant provisions are serving the functions as a guidance in an increasingly important area of food and technology policies, both nationally and internationally, namely how to utilize technology so that the starving people can end their starvation.

Notes

1. The relevant paragraphs of Article 1.2 of the FAO Constitution read: "The Organization shall promote and, where appropriate, shall recommend national and international action with respect to (a) scientific, technological, social, and economic research relating to nutrition, food and agriculture . . . (c) the conservation of natural resources and the adoption of improved methods of agricultural production. (d) the improvement of the processing, marketing, and distribution of food and agricultural products."
2. There are two paragraphs that have references to "scientific" and "science," namely paragraph (a) on research and paragraph (b) on education and the "spread of public knowledge of nutritional and agricultural science."
3. These are areas 3), 4), 5), 6), and 9), and all also have an international dimension. The other areas relate—to a greater or lesser extent—to other parts of Article 11, as well as Article 15 of the Covenant: 1) relates—under certain strict conditions—to Article 15.1(c); 2) and 10) relate to international cooperation, as recognized in Article 11.2; 7) relates to developing or reforming agrarian systems of Article 11.2(a); 8) relates to development and utilization of natural resources of Article 11.2(a).
4. The full wording of Article 11.2(a) ICESCR reads: "The States Parties to the present Covenant, recognizing the fundamental right of everyone to be free from hunger, shall take, individually and through international co-operation, the measures, including specific programmes, which are needed: (a) To improve methods of production, conservation and distribution of food by making full use of technical and scientific knowledge, by disseminating knowledge of the principles of nutrition and by developing or reforming agrarian systems in such a way as to achieve the most efficient development and utilization of natural resources."
5. A general comment is a nonbinding document adopted by the respective treaty monitoring body, on their own initiative. To the extent that such general comments are actually referred to in resolutions, plans of action, or national legislation, their status will increase accordingly. General comments elaborating on specific provisions of human rights treaties are usually held to be the *most* authoritative interpretation of such provisions.
6. Article 2.1 ICESCR reads: "Each State Party to the present Covenant undertakes to take steps individually and through international co-operation especially economic and technical, to the maximum of its available resources with a view to achieving progressively the full realization of the rights recognized in the present Covenant by all appropriate means, including particularly the adoption of legislative measures."
7. For recent studies on international agricultural research, see the International Assessment of Agricultural Science and Technology for Development (IAASTD) 2007. The IAASTD will "evaluate the relevance, quality and effectiveness of agricultural knowledge, science, and technology (AKST); and effectiveness of public and private sector policies as well as institutional arrangements in relation to AKST." Retrieved from <http://www.agassessment.org>, accessed February 13, 2007.
8. Article 15.1(c) of the ICESCR reads: "The States Parties to the present Covenant recognize the right of everyone: [...] (c) 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."
9. Marks (2003; 296–297) argues that Article 15.1(c) (human rights of authors) and 15.3 (academic freedom) are "supporting rights" for Article 15.1(a) (right to take part in cultural life) and Article 15.1(b) (right to enjoy scientific benefits and its applications).
10. Article 15.2 ICESCR reads: "The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for the conservation, the development and the diffusion of science and culture."
11. WT/MIN(01)/DEC/W/2, 14 November 2001.
12. The most relevant articles in the CBD are: Article 12(b) (extracts) "Promote and encourage research which contributes to the conservation and sustainable use of biological diversity." Article 16.1 (extracts) "access to and transfer of technology [including biotechnology] among Contracting Parties are essential elements for the attainment of the objectives of this Convention." Article 18.1 (extracts): "promote international technical and scientific cooperation" Article 18.4 (extracts): "develop methods of cooperation for the development and use of technologies, including indigenous and traditional technologies" Article 19.1 (extracts): "Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, to provide for the effective participation in biotechnological research activities".
13. The most relevant articles in the ITPGRFA are: Article 5.1(c) (extracts): "... promote the development and transfer of appropriate technologies [...] with a view to improving the sustainable use of plant genetic resources for food and agriculture." Article 6.2(b) (extracts): "... strengthening research which enhances and conserves biological diversity." Article 6.2(c) (extracts): "... promoting, as appropriate plant breeding efforts, which with the participation of farmers, particularly in developing countries, strengthen the capacity to develop new varieties." Article 6.2(g): "reviewing, and as appropriate adjusting breeding strategies and regulations variety release and seed distribution."
14. Article 12.2 (b) ICESCR reads: "The steps to be taken by the States Parties to the present Covenant to achieve the full realization of this right shall include those necessary for: [...] (b) The improvement of all aspects of environmental and industrial hygiene."
15. The full wording of Article 1.2 ICESCR is "All peoples may, for their own ends, freely dispose of their natural wealth and resources without prejudice to any obligations arising out of international economic co-operation, based upon the principle of mutual benefit, and international law. In no case may a people be deprived of its own means of subsistence."
16. The principles of intertemporal law say that treaty *interpretation* shall be done in light of the conditions prevailing at the time of the adoption of the treaty. *Application* of the provisions of the treaty can take into account relevant rules of international law that have emerged subsequent to the adoption of the treaty (International Law Commission 1964: 8). This is in accordance with the "good faith" principle, acknowledged in Article 31.1 of the Vienna Convention on the Law of Treaties.

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A Latin American Sociopolitical Conceptualization of Human Rights

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Unlike their counterparts in Asia and Africa, many Latin American human rights scholars have passively accepted the supposed cultural relevance of the liberal discourse of human rights and have limited academic studies to the sphere of legal analysis. Nevertheless, the work of the social sciences in the region has enriched human rights thought and the practices of social movements have enriched human rights practice. This article proposes that the study of human rights in Latin America needs to move beyond the comfortable limits of European liberalism and enter the field of political sociology that studies precisely where violations occur and the construction of hemispheric defense by social movements. This suggests that a truly Latin American notion of human rights would be sociopolitical rather than legal as the major contribution of the region to discourse has been its philosophy of action and the practice of social movements inspired by this philosophy. More specifically, the article proposes a way to conceptualize human rights from a sociopolitical and Latin American perspective in such a way that it recovers the historical legacy of social struggles from a discursive perspective, relying in particular on ideas of genealogy and intertextuality and is based on the thought of Latin American, Asian, and African theorists and philosophers who have moved beyond the confines of liberalism.

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Many Latin American philosophers and legal scholars assume that, more than 500 years after colonization and almost 200 years after independence from Spain and Portugal, a largely Catholic and Westernized Latin America does not have a major problem with accepting a mainstream modern and secular discourse such as human rights. While Asian and African scholars have conducted theoretical examinations of human rights, suggesting the need for a cultural dialogue that includes the views of the Muslim or Hindu worlds or the

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