

# Intergenerational equity: a legal framework for global environmental change

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Sustainable development rests on a commitment to equity with future generations. In 1972 the United Nations Stockholm Conference on the Human Environment recognized that we had a responsibility to "protect and improve" the environment for both present and future generations. In 1992, we are faced with defining and implementing this commitment to future generations in the context of environmentally sustainable development.

Global environmental change affects our capacity to achieve sustainable development; it may help or hinder this process, although the focus is more on the latter. In turn, economic development causes global environmental changes. The implications of global environmental change are inherently long-term and require that we address equity issues that span two or more generations.

We have developed economic instruments to try to satisfy the needs of the present generation efficiently, but these are not adequate for addressing equity issues with future generations. While the incorporation of externalities is intended to ensure that the benefits from a proposed action exceed the costs and that those who bear these costs be adequately compensated, in practice it operates from the perspective of the present generation. Environmental externalities are focused primarily on the costs that the present generation bears in polluted air, water, and soils from industrial development, in deforestation, and in other aspects of economic development. The discount rate is used to consider future costs and benefits, again from the perspective of the present generation. Reliance on the discount rate to consider the future means that short-term benefits nearly always outweigh long-term costs, in part because long-term costs to the environment are hard to quantify.

International law has been fundamentally concerned with questions of fairness. It addresses the normative dimension that economic instruments implement. If we are going to achieve intergenerational equity, it is essential to analyse this normative relationship between generations. This chapter sets forth a theory of intergenerational equity in the context of global environmental change.

## *I. The temporal dimension in international law*

International law has always been concerned with justice, but usually between states in their present or past relationships with each other. Concern with intergenerational equity requires attention to the normative relationship between present and future generations.

In the past states have made general claims for intergenerational justice in few areas: the debates over a new international economic order) and the negotiations for the Law of the Sea Convention regarding exploitation of seabed minerals.<sup>2</sup> Intergenerational issues have recently surfaced in debates over responsibility for paying for mitigation of anticipated global environmental change, such as climate change or ozone depletion, resulting from countries' past and present industrial activities.

International law to date has addressed intertemporal issues primarily in the context of relating *the present to the past*. In public international law, an intertemporal doctrine applies to territorial claims and to certain other rules of customary international law and to several aspects of treaties. In private international law it is reflected in questions of choice of time, as in conflict-of-law rules.

In public international law, Judge Huber enunciated the intertemporal doctrine in the classic *Island of Palmas Arbitration*,<sup>3</sup> which involved a dispute between the United States and the Netherlands over sovereignty of the small Pacific island. As described by Judge Huber, the doctrine has two elements: that acts should be judged in light of the law at the time of their creation; and that rights acquired in a valid manner may be lost if not maintained in a manner consistent with the changes in international law.<sup>4</sup> The principle has been subsequently applied in a number of cases before the International Court of Justice, including the *Minquiers and Ecrehos Case*, *The Western Sahara Case*, *The North Sea Continental Shelf Case*, and the *Aegean Sea Continental Shelf Case*.<sup>5</sup> While the first element of the intertemporal doctrine has been widely accepted as a basic principle, the second has been controversial.<sup>6</sup>

In 1975 the Institut de Droit International adopted an authoritative resolution on intertemporal law that encompasses both elements of the doctrine.<sup>7</sup> The Institute's restatement extended beyond Judge Huber's formulation only in that it encouraged states to develop agreement among themselves on how to handle intertemporal problems that might arise in negotiating treaties and other agreements. It did not, however, extend beyond the classical formulation to include other related intertemporal issues, such as the development of international law by international declarations and resolutions of the United Nations General Assembly.

Although most disputes raising the intertemporal doctrine have involved territorial claims, the doctrine is applicable more broadly to other issues in customary international law and to treaties. For example, in the 1971 *Namibia Advisory Opinion*,<sup>8</sup> when the World Court considered whether South Africa's presence in Namibia by virtue of its 1919 League of Nations Mandate continued to be valid, it concluded that the meaning of "sacred trust" had evolved to "self-determination and independence of the people," which did not sustain South Africa's claim. While the Court did not refer to intertemporal law, MacWhinney has correctly characterized it as embracing it.<sup>9</sup> Similarly, Judge Elias notes that the doctrine of intertemporal law has also applied to the customary law of sovereign immunity.<sup>10</sup> The doctrine of intertemporal law applies to treaties as well as to customary international law, as indicated in *The Grisbadarna Case*, and the *North Atlantic fisheries Case*.<sup>11</sup> The deliberations of the International Law Commission in drafting the convention on the law of treaties revealed, however, divergent opinions and approaches to the precise formulation of the doctrine.<sup>12</sup> There are several intertemporal issues raised by treaties: the proper interpretation of a treaty over time, the continuing validity of a treaty in the face of changed circumstances, and

retroactive application. The Vienna Convention on the Law of Treaties contains specific provisions addressing these issues, although the doctrine of intertemporal law is not explicitly mentioned.<sup>13</sup> Customary international law doctrines, such as *pacta sunt servanda* and *rebus sic stantibus*, respond to the intertemporal question of the continuing validity of treaties.<sup>14</sup>

Intertemporal issues also arise in the context of procedural rules set by international tribunals. For example, the rule that local remedies must be exhausted raises issues such as the appropriate time to pursue local remedies, the point at which the pursuit is considered to be exhausted, and the appropriate time for raising objections based on this rule.<sup>15</sup> These issues have been particularly important in human rights cases, particularly those in Europe where the European Convention on Human Rights provides that the European Commission of Human Rights may address the issue of exhaustion of local remedies only within six months from the date of the final domestic decision.<sup>16</sup> While the time frames for these procedural intertemporal issues is relatively brief, the issues nevertheless demonstrate that we are already addressing intertemporal issues routinely in international law in relating the present to the past.

Intertemporal problems also occur in private international law. They arise primarily as conflicts in time of rules of private international law adopted in a particular country, conflicts in time of rules of intertemporal law of the *lex ford* and *lex causae*, and conflicts of time and space caused by changes in the connecting factor.<sup>17</sup> In the late 1970s, the Institut du Droit International undertook a comprehensive study of intertemporal problems in private international law that included both questions of applicable law and of relevant jurisdiction.<sup>18</sup> In 1981 the Institute adopted a resolution setting forth applicable rules to govern intertemporal problems in private international law.<sup>19</sup>

Intertemporal problems are common in national legal systems. Frequently they appear as conflict-of-law questions. The civil law tradition has a well-developed theory in conflicts-of-law cases of intertemporal law that invokes such distinctions as "intertemporel," "droit transitoire," and "conflit mobile," terms that have no ready equivalence in English or the common law traditions.<sup>20</sup> The common law system addresses the temporal dimension in conflicts of law empirically as it arises in specific cases. Courts have often reached contradictory conclusions on temporal issues in these cases.<sup>21</sup>

Temporal issues also arise in tort liability cases, most notably in compensatory claims by people who were exposed to radiation, harmful drugs, or toxic substances years previously. The numbers of cases have increased, as environmental harms from activities a decade or more ago emerge.

Thus, there is a temporal element in many aspects of public international law, private international law, and national legal traditions. The theory of intergenerational equity proposed in this chapter, which addresses the relationship between present and future generations, as well as past, extends the basic concern we already have with intertemporal problems to a longer time horizon.

Since World War II, states have expressed concern in international legal documents for the welfare of future generations. A growing number of international agreements, declarations, charters, and United Nations General Assembly resolutions reflect such

concern and set forth principles or obligations intended to protect and enhance the welfare of both present and future generations. Even the United Nations Charter, drafted in the aftermath of World War II, affirmed the universal concern for the welfare of future generations in its opening paragraph: "We the peoples of the United Nations, determined to save succeeding generations from the scourge of war..."<sup>22</sup>

Concern for justice to future generations regarding the natural environment first emerged as a major concern in the preparatory meetings for the 1972 Stockholm Conference on the Human Environment.

The preamble to the Stockholm Declaration on the Human Environment expressly refers to the objective of protecting the well-being of future generations, "... to defend and improve the environment for present and future generations has become an imperative goal for mankind - a goal to be pursued together with, and in harmony with, the established and fundamental goals of peace and of world-wide economic and social development."<sup>23</sup> The Declaration's first principle provides that "man... bears a solemn responsibility to protect and improve the environment for present and future generations," while the second declares that the "natural resources of the earth, including the air, water, land, flora and fauna... must be safeguarded for the benefit of present and future generations through careful planning and management."<sup>24</sup> The Stockholm Conference led directly to the creation of the United Nations Environment Programme (UNEP). The explicit concern for future generations and for enhancing the environment were new contributions to the process of developing international law in this area.

The concept of protecting the natural environment for future generations was explicitly incorporated into the language of three treaties negotiated more or less contemporaneously with the Stockholm Declaration: the 1972 London Ocean Dumping Convention, the 1973 Convention on International Trade in Endangered Species, and the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage.<sup>25</sup> The regional seas conventions that were subsequently negotiated under UNEP carried forward concern for future generations.<sup>26</sup>

There have been other international agreements in the last two decades that have contained language indicating either a concern for sustainable use of the environment or a concern for future generations, sometimes by reference to the common heritage of mankind.<sup>27</sup> Other legal instruments evidence similar concern. The 1982 World Charter for Nature, not a formal agreement, refers explicitly to a global concern for the heritage we leave to future generations.<sup>28</sup> At the tenth anniversary of the Stockholm Declaration, countries reaffirmed the continuing validity of the Declaration and urged "all Governments and peoples of the world to discharge their historical responsibility, collectively and individually, to ensure that our small planet is passed over to future generations in a condition which guarantees a life in human dignity for all."<sup>29</sup>

The more recent attempts to develop a precautionary principle in international law reflect concern about the effects of our actions today on the environment of future generations. The principle attempts to answer the question of when to constrain activities that risk harming the environment in the future. It was first endorsed in 1987 at the International Conference on the North Sea and has been invoked most

extensively in marine instruments. It has been heatedly invoked during the negotiations for a climate change convention.

While there has been considerable debate about the principle and its content, there is no single agreed formulation. The Group of 7 Ministerial Declaration in July 1990 stated (in relation to climate change) that "in the face of threats of irreversible environmental damage, lack of full scientific certainty is no excuse to post-ponse actions which are justified in their own right."<sup>30</sup> The UN Economic Commission for Europe ministerial meeting in Bergen in May 1990 declared: "Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."<sup>31</sup> Since there is never scientific certainty but always some uncertainty, these formulations do not address the difficult issues of whether, when, and how to take action against identifiable risks.<sup>32</sup> The fall 1991 meeting of parties to the London Ocean Dumping Convention adopted text that provides a useful formulation of a precautionary principle in a specific context.<sup>33</sup>

The internationally evolving precautionary principle has deep roots in the domestic environmental statutes and regulations of countries, many of which focus on pollution prevention in water, air, and soils. This approach reflects a growing willingness to relate the present to the future in legal norms.

The concern already expressed in legal instruments with the environment we pass to future generations serves as an important starting point in defining and implementing international legal principles for achieving justice among generations: past, present, and future.

## *II. Alternative approaches to intergenerational equity*

There are several approaches to defining intergenerational equity in the context of the relationship among generations to the planet Earth.

The first is the preservationist model, in which the present generation does not destroy or deplete resources or significantly alter anything; rather it saves resources for future generations and preserves the same level of quality in all aspects of the environment. This preservationist model has deep roots in the original natural-flow theory of English water law, in which riparians could use stream water so long as their use did not impair in any way the quantity or quality of water for those downstream. Ultimately this benefits the last riparians before the stream enters the ocean or disappears, because they have no one to whom they owe an obligation.

The preservationist model, if carried to its extreme in saving unspoiled ecosystems, would promote the status quo.<sup>34</sup> It is only consistent with a subsistence economy, not with an industrialized world. In a more flexible form, the model supports the socialist model of economic development applied by Stalin, in which citizens were urged to sacrifice today for a better tomorrow.<sup>35</sup> This attitude was common to the Calvinists as well.<sup>36</sup> In both, future generations benefit at the expense of earlier generations.

The other extreme can be termed the 'opulence model' in which the present generation consumes all that it wants today and generates as much wealth as it can, either because

there is no certainty that future generations will exist or because maximizing consumption today is the best way to maximize wealth for future generations.<sup>37</sup> This model overlooks the long-term degradations of the planet that may be generated, such as irreversible losses of species diversity and of renewable resources such as soils and fish, and costly environmental contamination as by insufficiently controlled nuclear or hazardous wastes that make areas unfit for habitation and use. Further under this model, the present generation may trigger irreversible changes in the global climate system that will affect habitability in parts of the world.

Even if we knew that we were the last generation of the human community to live on earth, it is still not clear that we would have the right to desecrate it, or to destroy it, since the human community is, in the end, only part of a much larger natural system, which we can use for our own benefit but must also pass on for others.

A variant of the opulence model is the technology model, in which we do not need to be concerned about the environment for future generations, because technological innovation will enable us to introduce infinite resource substitution.<sup>38</sup> While technology will undoubtedly enable us to develop some substitutes for certain resources and to use resources more efficiently, it is by no means assured that it will suffice or will make the robustness of the planet irrelevant.

Finally, we have the environmental economics model, which argues that if we were to do proper natural resource accounting, we would fulfil our obligations to future generations. The economic tools that we have developed today -environmental externalities and discounting- are sufficient, were we to apply "green" economics. While proper accounting is essential to implementing intergenerational equity, it arguably is not sufficient as presently conceived.

### **The proposed theory of intergenerational equity**

Sustainability is possible only if we look at the Earth and its resources not only as an investment opportunity but as a trust, passed to us by our ancestors, to be enjoyed and passed on to our descendants for their use. Such a "planetary trust" conveys to us both rights and responsibilities. Most importantly, it implies that future generations too have rights - although to be sure, these rights have meaning only if we the living respect them and if this respect transcends the differences among countries, religions, and cultures.

The theory of intergenerational equity proposed argues that we, the human species, hold the natural environment of our planet in common with all members of our species: past generations, the present generation, and future generations.<sup>39</sup> As members of the present generation, we hold the Earth in trust for future generations. At the same time, we are beneficiaries entitled to use and benefit from it.<sup>40</sup>

There are two relationships that must shape any theory of intergenerational equity in the context of our natural environment: our relationship to other generations of our own species and our relationship to the natural system of which we are a part. The human species is integrally linked with other parts of the natural system; we affect and are affected by what happens in the system. We alone among all living creatures have the capacity to shape significantly our relationship to the environment. We can use it

on a sustainable basis or we can degrade environmental quality and deplete the natural-resource base. As the most sentient of living creatures, we have a special responsibility to care for the planet.

The second fundamental relationship is that between different generations of the human species. All generations are inherently linked to other generations, past and future, in using the common patrimony of earth. The theory of intergenerational equity stipulates that all generations have an equal place in relation to the natural system. There is no basis for preferring the present generation over future generations in their use of the planet.

This premise finds deep roots in international law. The Preamble to the Universal Declaration of Human Rights begins: "Whereas recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world..."; the reference to all members of the human family has a temporal dimension, which brings all generations within its scope. The reference to equal and inalienable rights affirms the basic equality of such generations in the human family.

Partnership between generations is the corollary to equality. It is appropriate to view the human community as a partnership among all generations. In describing a state as a partnership, Edmund Burke observed that "as the ends of such a partnership cannot be obtained in many generations, it becomes a partnership not only between those who are living but between those who are living, those who are dead, and those who are to be born."<sup>41</sup> The purpose of human society must be to realize and protect the welfare and well-being of every generation, in relation to the natural system, of which it is a part. This requires sustaining the robustness of the planet: the life-support systems and the ecological processes and environmental conditions necessary for a healthy and decent human environment.

In this partnership, no generation knows beforehand when it will be the living generation, how many members it will have, or even how many generations there will ultimately be. If we take the perspective of a generation that is placed somewhere along the spectrum of time but does not know in advance where it will be located,<sup>42</sup> such a generation would want to inherit the Earth in at least as good condition as it has been in for any previous generation and to have as good access to it as previous generations. This requires each generation to pass the planet on in no worse condition than it received it in and to provide equitable access to its resources and benefits. Each generation is thus both a trustee for the planet with obligations to care for it and a beneficiary with rights to use it.

If one generation fails to conserve the planet at the level of quality received, succeeding generations have an obligation to repair this damage, even if costly to do so. However, they can distribute the costs across several generations, by means of revenue bonds and other financial measures, so that the benefits and costs of remediation are distributed together. While the generation that allows environmental quality to deteriorate still benefits at the expense of immediate future generations, more distant future generations are protected. Moreover, the generation inflicting the harm may have passed on a sufficiently higher level of income so that immediate successor generations have sufficient wealth to manage the deterioration effectively.

While intergenerational equity may be viewed as in conflict with achieving intragenerational equity, the two can be consistent and in fact must go together. Members of the present generation have an intergenerational right of equitable access to use and benefit from the planet's resources, which derives from the underlying equality that all generations have with each other in relation to their use of the natural system.

Moreover, even the most selfish members of the present generation who care only about their own descendants must as they extend further into time increasingly care about the general environment that they will inherit. Since no one country or group of countries has the power alone to ensure a healthy environment, all must cooperate to ensure a robust planet in the future. Since poverty is a major cause of ecological degradation, this means meeting the basic needs of the poor, so that they will have both the desire and ability to fulfil their intergenerational obligations to conserve the planet.

To be sure, there are instances where the actions needed to protect the health of the planet for future generations may conflict with the need to alleviate poverty as quickly as possible. In these instances, we need to develop appropriate mechanisms and allocate sufficient resources to maximize the ability to advance both goals.

The theory of intergenerational equity has a deep basis in international law.<sup>43</sup> The United Nations Charter, the Preamble to the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, the Convention on the Prevention and Punishment of the Crime of Genocide, the American Declaration on the Rights and Duties of Man, the Declaration on the Elimination of Discrimination against Women, the Declaration on the Rights of the Child, and many other human rights documents reveal a fundamental belief in the dignity of all members of human society and in an equality of rights that extends in time as well as space. Indeed, if we were to license the present generation to exploit our natural and cultural resources at the expense of the well-being of future generations, we would contradict the purposes of the United Nations Charter and international human rights documents.

The proposed theory of intergenerational equity also finds deep roots in the religious, cultural, and legal tradition of the world. Islamic law regards man as having inherited "all the resources of life and nature" and having certain religious duties to God in using them.<sup>44</sup> Each generation is entitled to use the resources but must care for them and pass them to future generations.

... The utilization and sustainable use of these resources, is in Islam, the right and privilege of all people. Hence, man should take every precaution to ensure the interests and rights of all others since they are equal partners on earth. Similarly, he should not regard such ownership and such use as restricted to one generation above all other generations. It is rather a joint ownership in which each generation uses and makes the best use of nature. according to its need, without disrupting or upsetting the interests of future generations. Therefore, man should not abuse, misuse or distort the natural resources as each generation is entitled to benefit from them but is not entitled to own them permanently.<sup>45</sup>



Islamic law supports collective restrictions, which are to be observed under a principle of good faith, and collective rights, which are rights of the community of believers as a whole.<sup>46</sup>

In the Judeo-Christian tradition, God gave the earth to his people and their offspring as an everlasting possession, to be cared for and passed on to each generation.<sup>47</sup> This has been carried forward in both the common law and the civil law traditions. The English philosopher John Locke, for example, asserts that whether by the dictates of natural reason or by God's gift "to Adam and his posterity," mankind holds the world in common. Man may only appropriate as much as leaves "enough, and as good" for others. He has an obligation not to take more fruits of nature than he can use, so that they do not spoil and become unavailable to someone else for use - i.e., an obligation not to waste the fruit of nature.<sup>48</sup> To be sure, there are many instances where law has been used to authorize the destruction of our environment, but the basic thesis that we are trustees or stewards of our planet is deeply embedded.

In the civil law tradition, this recognition of the community interest in natural property appears in Germany in the form of social obligations that are inherent in the ownership of private property.<sup>49</sup> Rights of ownership can be limited for the public good, without the necessity to provide compensation to the owners. Thus legislatures can ban the disposal of toxic wastes in ecologically sensitive areas and invoke the social obligation inherent in property to avoid monetary compensation to the owner of the land. In common law countries such as the United States, local governments can do this through the exercise of the police power<sup>50</sup> - the power to protect the health and welfare of its citizens - or the public trust doctrine.

The socialist legal tradition also has roots that recognize that we are only stewards of the earth. Karl Marx, for example, states that all communities, even if taken together, are only possessors or users of the earth, not owners, with obligations to protect the earth for future generations.<sup>51</sup>

African customary law contains deep roots for the principle that we are only tenants on Earth, with obligations to past and future generations. Under the principles of customary land law in Ghana, land is owned by a community, which goes on from one generation to the next. A distinguished Ghanaian chief said, "I conceive that land belongs to a vast family of whom many are dead, a few are living, and countless host are still unborn."<sup>52</sup> Land thus belongs to the community, not to the individual. The chief of the community or head of the family is like a trustee who holds it for the use of the community. Members of the community can use the property, but cannot alienate it. Customary laws and practices of other African communities, and indeed of peoples in other areas of the world, also view natural resources as held in common with the community promoting responsible stewardship and imposing restrictions on rights of use.<sup>53</sup>

The non-theistic traditions of Asia and South Asia, such as Shinto, also provide deep roots for a respect for nature and for our responsibilities to future generations as stewards of this planet. In most instances they call for living in harmony with nature.<sup>54</sup> Moreover, the orthodoxy of Hinduism, Buddhism, and Jainism indirectly support the conservation of our diverse cultural resources in their acceptance of the legitimacy of other religious groups.<sup>55</sup>

### *III. Principles of intergenerational equity*

Three principles form the basis of intergenerational equity. First, each generation should be required to conserve the diversity of the natural and cultural resource base, so that it does not unduly restrict the options available to future generations in solving their problems and satisfying their own values, and should also be entitled to diversity comparable to that enjoyed by previous generations. This principle is called "conservation of options." Second, each generation should be required to maintain the quality of the planet so that it is passed on in no worse condition than that in which it was received, and should also be entitled to planetary quality comparable to that enjoyed by previous generations. This is the principle of "conservation of quality." Third, each generation should provide its members with equitable rights of access to the legacy of past generations and should conserve this access for future generations. This is the principle of "conservation of access."

The proposed principles recognize the right of each generation to use the Earth's resources for its own benefit, but constrain the actions of the present generation in doing so. Within these constraints they do not dictate how each generation should manage its resources. They do not require that the present generation predict the preferences of future generations, which would be difficult if not impossible. Rather, they try to ensure a reasonably secure and flexible natural resource base for future generations that they can use to satisfy their own values and preferences. They are generally shared by different cultural traditions and are generally acceptable to different economic and political systems.

While the principle of quality may be viewed as including the principle of diversity, they are separate and complementary. To illustrate this, we can invoke the analogy of a common law trust, whose corpus consists of investments in two different energy companies and a computer company. If the trustee shifts the investments into other energy and computer companies that turn out to be lower in quality as investments, the value of the trust corpus declines, but the diversity of the holdings does not change. By contrast, if the trustee combines all the investments into a single oil company, the value of the holdings may remain the same, but the diversity of the holdings is sharply compromised.<sup>56</sup>

In our planet, environmental quality may decline, but this does not necessarily reduce significantly the diversity of the resource base. Similarly, it may be possible for one generation to sustain the quality of air and water but substantially destroy the diversity of the resource base, as by a significant loss of genetic diversity. Certainly the two principles interact and feed upon each other. It is easier to maintain quality if there are many options available for doing so, and serious water pollution may cause fish to disappear. It is easier to conserve options when there is concern for maintaining quality. Both principles are essential for a robust planet for future generations and must be implemented in tandem.

#### **Conservation of options**

Future generations are more likely to survive and attain their goals if they have a variety of options for addressing their problems. Conserving the diversity of the

natural and cultural resource bases is designed to give our descendants a robust and flexible heritage with which to try to achieve a decent and healthy life.<sup>57</sup>

The principle of conserving options rests on the premise that diversity, like quality, contributes to robustness. This can be seen in the contribution of biological diversity to the robustness of ecosystems. If diverse strains and species are present in an ecosystem and the system is perturbed, some strains and species will survive and multiply. While the distribution of the biological population may change, the ecosystem remains viable.<sup>58</sup> By contrast, farmers producing monocultures have to work hard to preserve them, for they are easily eliminated through the invasion of weeds, insects, and other pests. Some theoretical scientific research suggests, however, that as systems become more complex (more species and a richer structure of interdependence), they may become more dynamically fragile. This suggests that we need to understand the special kinds of complexity that promote stability.<sup>59</sup>

Biological diversity as it relates to robustness encompasses change in the species and strains that make up the ecosystem.<sup>60</sup> This point is essential to intergenerational justice, for it means that change, which is essential for economic development, is an integral part of implementing the principle.

The wisdom of conserving options is reflected more broadly in conventional economic practices, such as maintaining diversity in the corpus of a common law trust, portfolios of investments, and national economies. In these latter examples, diversity is primarily viewed as a means of spreading risks to avoid reliance on only one investment or industry. At the same time it offers an effective strategy for improving economic wealth.

The question arises, however, whether conserving options does not disregard the needs of the present generation. It may be argued that the best way to conserve options is to preserve the status quo, which means that poor people in particular will continue to suffer.<sup>61</sup>

This argument applies the principle incorrectly. Conservation of options can be accomplished by new technological developments that create substitutes for existing resources or processes for exploiting them more efficiently, as well as by conservation of existing resources. Certainly any investment in the development of particular resources forecloses other options for that resource. The decision to convert an area to solar panels will foreclose use of the land for crops, at least for that period of time. But the solar panels may help to conserve more scarce energy supplies, such as helium-rich natural gas reserves, or to avoid fossil-fuel emissions that contribute to climate change. To the extent that a hydroelectric dam or mine will destroy a unique natural resource, however, we must proceed extremely cautiously, if at all, because future generations might be willing to pay us handsomely to conserve it for them.

The principle of conservation of options requires that on *balance* the diversity of the resource base be maintained. It acts as an important brake on those who would destroy biological diversity by clear-cutting tropical areas, developing crop monocultures to the exclusion of conserving wild cultivars, exhausting all known quantities of essentially non-renewable resources such as oil and helium-bearing natural gas, or discarding the cultural resources of all but a few dominant cultures.

## **Conservation of quality**

The principle of conservation of quality requires that we leave the quality of the natural and cultural environments in no worse condition than we received it. Recent generations have used resources of air, water, and soils as free resources for dumping their wastes, thereby passing on the costs of their activities to future generations in the form of degraded quality of air and water, with accompanying harms to plant and animal life and to human health.

The principle of conserving quality is consistent with environmentally sustainable growth. It does not mean that the environment must remain unchanged, which would be inconsistent in any event with conserving the present generation's access to the benefits of the planet. In determining whether one generation is conserving quality, trade-offs are inevitable. For example, we may exhaust more reserves of a natural resource and cause modest levels of pollution, but pass on a higher level of income, capital, and knowledge sufficient to enable future generations to develop substitutes for the depleted resource and methods for abating or removing pollutants. A framework must be developed in which such balancing can take place. Necessary components will be predictive indices of resource diversity and resource quality, baseline measurements, and an improved capacity to predict technological change.

It is natural to assume that present trends in natural and social systems will continue. However, breaking-points may exist in key variables beyond which these systems will reorganize and substantially change their properties. Predicting these breaking-points is thus of critical importance, probably more important than predicting specific technological changes, since such breaking-points would indicate the need for deliberate human intervention.<sup>62</sup>

According to the Gaia hypothesis, the Earth's biosphere is a complex entity that has a homoeostatic feedback system capable of maintaining an optimal physical and chemical environment for life on Earth.<sup>63</sup> Even if this is the case, there is still a question of whether there are limits in critical variables beyond which this homoeostatic quality no longer obtains.

## **Conservation of access**

Conservation of access gives the members of the present generation a reasonable, non-discriminatory right of access to the natural and cultural resources of our planet. This means they are entitled to these resources to improve their own economic and social well-being provided that they respect their equitable duties to future generations and do not unreasonably interfere with the access of other members of their generation to these same resources.

This offers a principle of justice between generations and between members of the same generation. The refinement of what conservation of access means as applied to members of the present generation is extremely complex. It implies both that the

patrimony itself to which they have access should be comparable in quality and diversity (or robustness) to previous generations and that they should have a minimum level of resources so that they can in fact have access to such a patrimony. Thus, members of the present generation must not degrade the patrimony available, and to the extent that some members are too impoverished to have effective access, must assist them to gain such access.

#### *IV. Intergenerational rights and obligations*

The principles of options (diversity), quality, and access form the basis of a set of intergenerational obligations and rights, or planetary rights and obligations, that are held by each generation. These rights and obligations derive from each generation's position as part of the intertemporal entity of human society. Planetary intergenerational rights and obligations are integrally linked; the rights are always associated with obligations. They represent in the first instance a moral protection of interests, which must be transformed into legal rights and obligations.

Planetary rights and obligations coexist in each generation. In the intergenerational dimension, the generations to which the obligations are owed are future generations, while the generations with which the rights are linked are past generations. Thus the rights of future generations are linked to the obligations of the present generation. In the intragenerational context, planetary obligations and rights exist between members of the present generation. They derive from the intergenerational relationship that each generation shares with those who have come before and those yet to come. Thus, intergenerational obligations to conserve the planet flow from the present generation both to future generations as generations and to members of the present generation, who have the right to use and enjoy the planetary legacy.

Intergenerational rights of necessity inhere in all generations, whether these be immediately successive generations or ones more distant. There is no theoretical basis for limiting such rights to immediately successive generations. If we were to do so, we would often provide little or no protection to more distant future generations. Nuclear and hazardous-waste disposal, the loss of biological diversity, and ozone depletion, for example, have significant effects on the natural heritage of more distant generations.

Intergenerational planetary rights may be regarded as group rights, as distinct from individual rights, in the sense that generations hold these rights as groups in relation to other generations - past, present, and future.<sup>64</sup> They exist regardless of the number and identity of individuals making up each generation. When held by members of the present generation, they acquire attributes of individual rights in the sense that there are identifiable interests of individuals that the rights protect. However, those interests derive from the fact that those living now are members of the present generation and have rights in relation to other generations to use and benefit from planet Earth. The remedies for violations of these rights will benefit other members of the generation, not only the individual.

More broadly, intergenerational rights may provide a theoretically attractive framework for linking a number of disparate rights that have inherently a temporal dimension. These include cultural rights and rights to development, which implicitly assume that there are continuing processes that are to be protected.

It has been argued that future generations cannot have rights, because rights exist only when there are identifiable interests, which can only happen if we can identify the individuals who have interests to protect. Since we cannot know who the individuals in the future will be, it is not possible for future generations to have rights.<sup>65</sup>

This paradox assumes the traditional conceptual framework of rights as rights of identifiable individuals. But planetary intergenerational rights are not in the first instance rights possessed by individuals. They are, instead, *generational* rights, which must be conceived of in the temporal context of generations. Generations hold these rights as groups in relation to other generations - past, present, and future. This is consistent with other approaches to rights, including the Islamic approach, which treats human rights not only as individual rights, but as "rights of the community of believers as a whole."<sup>66</sup> They can be evaluated by objective criteria and indices applied to the planet from one generation to the next. To evaluate whether the interests represented in planetary rights are being adequately protected does not depend upon knowing the number of kinds of individuals that may ultimately exist in any given future generation.

One might still ask whether it is not preferable to speak only of planetary obligations toward future generations without corresponding intergenerational rights. Can intergenerational obligations exist without rights?<sup>67</sup> While rights are always connected to obligations, the reverse is not always true. Theoretically, an obligation need not always entail a right. For example, a moral obligation of charity does not give those who benefit a right to charity.

While this approach may be attractive, it ignores the fundamental temporal relationship that each generation has to all other generations and that gives rise to the rights of each generation to share equitably in the use of the planet and its natural resources. These rights focus discussion on the welfare of generations, what each generation is able to have and to enjoy, in a way that obligations cannot. If obligations of the present generation are not linked with rights, the present generation has a strong incentive to bias the definition of these obligations in favour of itself at the expense of future generations. Intergenerational rights have greater moral force than do obligations. They provide a basis for protecting the interests of all generations in a healthy and robust planet.<sup>68</sup> The content of intergenerational rights is framed by the principles of intergenerational equity. Within this constraint, each generation has the responsibility to set criteria for defining the actions that infringe upon these rights. Appropriate criteria would be whether activities have a significant impact, either spatially or over time, whether the effects are irreversible or reversible only with unacceptable costs, and whether the effects will be viewed as significant by a substantial number of people. Certain categories of actions can be identified as likely infringing upon intergenerational rights. They include the following:

- wastes whose impacts cannot be confidently contained either spatially or over time;
- damage to soils such that they are incapable of supporting plant or animal life;
- tropical-forest destruction sufficient to diminish significantly the overall diversity of species in the region and the sustainability of soils;

- air pollution or land transformations that induce significant climate change on a large scale;
- destruction of knowledge essential to understanding natural and social systems, such as residence decay times of nuclear wastes;
- destruction of cultural monuments that countries have acknowledged to be part of the common heritage of mankind;
- destruction of specific endowments established by the present generation for the benefit of future generations, such as libraries and gene banks.

Some international agreements already obligate countries to guard against such actions. These include the London Ocean Dumping Convention, which controls dumping of hazardous and nuclear wastes in the marine environment; the Antarctic Treaty and the new Environmental Protocol; the World Soils Charter; the Montreal Protocol on Substances That Deplete the Ozone Layer; and the World Heritage Convention.

Intergenerational planetary rights may also be linked to certain procedural norms, which are important to achieving the substantive norms. For example, access to information, public participation, and long-term impact assessments are emerging as potentially important instruments for achieving intergenerational equity.

Enforcement of intergenerational planetary rights is appropriately done by a guardian or representative of future generations as a *group*, not of future individuals, who are of necessity indeterminate. While the holder of the right may lack the capacity to bring grievances forward and hence depends upon the representative's decision to do so, this inability does not affect the existence of the right or the obligation associated with it.

Developments in international law outside the field of the environment make acceptance of intergenerational rights a natural and desirable evolution. Indeed, international human rights law - the genocide convention, and the prohibition against racial discrimination, to cite two examples - are arguably directed as much to the protection of future as to present generations. The extinction of, for example, an entire people is more odious in law than the murder of an equal number of people constituting a minority of each of several groups. Similarly, discrimination denies an "equal place at the starting gate" not only to the generation of the suppressed group, but (by implication) also to future generations. Provisions in other human rights agreements refer to rights of children and of the elderly, and to education and training, which are implicitly temporally oriented.

Intergenerational rights and obligations may have implications for population policies. While the existence of the rights does not depend upon knowing the composition of the future generation, nevertheless, if the earth's population continues to grow rapidly, the amount of diversity and degree of quality that must be passed on will be higher than if the population in the future were at the same level or less than it is today. Whether a generation chooses to meet its obligations by curtailing exploitation, consumption, and waste or by constraining population growth is a decision it must make. The fact that future generations have a generational right to receive the planet in

a certain condition limits the extent to which a present generation can ignore this choice.

Almost every policy decision of government and business affects the composition of future generations, whether or not they are taken to ensure their rights under the guidelines enunciated above. Decisions regarding war and peace, economic policy, the relative prosperity of different regions and social groups, transportation, health, education - all influence the demographics and the composition of future generations by affecting the lives and fortunes of the present generation. This opens the possibility that all decisions deserve to be scrutinized from the point of view of their impact on future generations. The possibility that intergenerational equity may place limits on our actions is an important new area of research on sustainable development. But such constraints must be applied narrowly, however, so that concern for future generations does not become a blunt instrument to thwart proposals for change. The purpose must be only to protect against long-term environment damage, such as toxic groundwater pollution, radiative pollution of the oceans, soil degradation, etc., whose effects are difficult or impossible to reverse unless there are extremely compelling reasons to do so beyond profitability.

Planetary rights of future generations provide a normative framework for implementing environmentally sustainable development. They mean that we do not have to rely on a sense of patronizing generosity by the present generation, but on a fundamental entitlement of future generations. It is an entitlement that we ourselves, as members of the present generation, held in relation to our ancestors and that we need now to protect for our descendants.

#### *V. Implementation of intergenerational equity*

Strategies for implementing intergenerational equity are set forth in detail elsewhere.<sup>69</sup> Several of them merit special attention in this chapter.

### **Representation to future generations**

Future generations are not effectively represented in the decision-making processes today, although the decisions we make today will determine their initial welfare. While future generations may be willing to pay us handsomely to prevent certain actions or to have us undertake others, they have no way of voicing this preference. Representation must take place in several different forms: in the market place, in legislative and administrative decision-making, and in judicial decision-making.

Future generations are not effectively represented in the market place today; they must be. This requires that we understand the fundamental entitlement among generations correctly, so that we recognize that future generations have an equal claim with the present generation to use and benefit from the natural environment. Once we recognize this entitlement of equality among generations, economic instruments can be developed to achieve intergenerational equity efficiently.<sup>70</sup>



In administrative and judicial decisions, we can appoint and publicly finance an office that has responsibility for ensuring that the interests of future generations are considered and for ensuring that laws regarding our environment and natural resources are observed, for investigating complaints, and for providing warnings of pending problems. States could give standing in their national courts and administrative bodies to a representative of future generations, who might function as a guardian *ad litem*. Another approach is to designate an ombudsman for future generations or to appoint commissioners for future generations. These could operate internationally, nationally, or locally. The World Commission on Environment and Development recommended that countries consider a national ombudsman.<sup>71</sup>

### **Development in international legal instruments**

To encourage cooperation between countries and among communities to fulfill obligations to future generations, it is useful to elaborate and codify the relevant norms of intergenerational equity. Codification reduces the ambiguities about expected behaviour and defines cooperative behaviour from uncooperative behaviour.

Some of these legal instruments will be binding. Others may be non-binding legal instruments, or may become binding over time. To the extent that the norms represent customary international law, they will become binding upon all countries, whether or not they are party to the relevant agreement. We need to encourage both general legal instruments articulating intergenerational rights and obligations in relation to our planet, as well as binding agreements directed to conserving specific resources, such as forests and living resources essential to maintaining biological diversity, or to pollution prevention.

International regimes to manage or to coordinate measures for managing particular natural resources or environmental pollutants are important. They facilitate the development and exchange of information, make it more difficult for a party to defect since there are costs involved, and may contribute to the developing of new norms. It is important that relevant states participate in the regime in order to avoid pollution havens or free riders in the international community. This calls for states to provide incentives and disincentives to encourage participation.

### **Planetary ethos**

To implement intergenerational equity, we need an ethos that is planetary in scope and encompasses all generations. This requires that we raise public consciousness and educate people about environmentally sustainable development. Communities have a right to know about the environmental contaminants in their area and about the sustainability of natural-resource consumption patterns. Nongovernmental organizations, whether corporate or environmentally based, have a particularly important role in ensuring this. The information revolution that is upon us should greatly assist in providing the information necessary to do this and in mobilizing public participation in developing and implementing measures to achieve intergenerational equity.

If we review the progress of the international community in addressing intergenerational environmental concerns in the last two decades, we can conclude, on

the one hand, that it is highly insufficient to the task. But if we compare where we are today to 1972, we cannot help but be impressed by the rapid learning curve of countries in addressing these issues.

The issue for 1972 was the reconciliation of environment and development. The issue in 1992 is achieving environmentally sustainable development and committing to a new ethos of intergenerational fairness.

## Notes

This chapter is adapted from E. Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony, and Intergenerational Equity* (Transnational/United Nations University, 1989) and E. Brown Weiss, "Our Rights and Obligations to Future Generations for the Environment," 84 *American Journal of International Law*, 198 (1990). The analysis in this chapter also applies to cultural resources. For details, see *In Fairness to Future Generations*.

1. Charter of Economic Rights and Duties of States, 12 Dec. 1974, 14 *I.L.M.* 251 (1975); Declaration on the Establishment of a New International Economic Order, 1 May 1974 13 *I.L.M.* 715 (1974).

2. See E.G. Bellow, "International Equity and the Law of the Sea," 13 *Verfassung und Recht in Übersee*, 201-212 (1980); R.J. Dupuy, *L'Océan Partagé* (A. Pedone, 1979).

3. *Island of Palmas Arbitration*, 2 R. Int'l Arb. Awards 831 (1928).

4. *Id.* at 831.

5. *Minquiers and Ecrehos Case*, 1953 I.C.J. Rep. 47; *The Western Sahara Case*, 1975 I.C.J. Rep. 39; *The North Sea Continental Shelf Case*, 1969 I.C.J. Rep. 3; *Aegean Sea Continental Shelf Case*, 1978 I.C.J. Rep. 1.

6. See T.O. Elias, "The Doctrine of Intertemporal Law," 74 *A.J.I.L.* 285 (1980). The late Judge Jessup criticized the second aspect of the doctrine in the *Palmas* decision as requiring constant vigilance by a state to avoid losing its territory by default. P. Jessup, "The Palmas Island Arbitration," 22 *A.J.I.L.* 735 (1928). But as Brownlie has noted, intertemporal law is subject to "the effect of recognition, acquiescence, estoppel, prescription, the rule that abandonment is not to be presumed," which counters this possibility. I. Brownlie, *Principles of Public International Law*, 131-132 (Clarendon Press, 3rd ed., 1980).

7. 56 *Annuaire de l'Institut de droit international*, 536-541 (1975).

8. *Namibia Advisory Opinion*, 1971 I.C.J. Rep. 16.

9. E. MacWhinney, "The Time Dimension in International Law: Historical Relativism and Intertemporal Law," in *Essays in International Law in Honour of Judge Manfred Lachs*, 1979 (J. Makarczyk, ed., Martinus Nijhoff, 1984).

10. See *Trendtex Trading Corporation v. Central Bank of Nigeria*, 2 W.L.R. 356 (1977), reprinted in 16 *I.L.M.* 471 (1977). Elias, *supra* note 6 at 293-296.

11. *The Grisbadarna Case*, 11 R. Int'l Arb. Awards 155 (1909); and the *North Atlantic Coast Fisheries Case*, 11 R. Int'l Arb. Awards 167 (1910).

12. 1 *Y.B. Int'l L. Comm'n*, 199-203 (1964); 2 *Y.B. Int'l L. Comm'n*, 211-222 (1966); Elias, *supra* note 6 at 302-305.

13. See, e.g., Art. 28 (non-retroactivity of treaties), Art. 31 (general rule of interpretation), Art. 32 (supplementary means of interpretation), and Art. 62 (fundamental change of circumstance), Vienna Convention on the Law of Treaties, 23 May 1969, 8 *I. L. M.* 679 (1969).

14. The maxim *pacta sunt servanda* ("treaties must be observed") was tempered by the principle of *rebus sic stantibus* ("while things remain as they now stand"), which holds that treaty obligations are terminated in the case of a fundamental change in the circumstances existing at the time the treaty was concluded, as long as the consent of the parties was based on the existence of those circumstances. An excellent study of the doctrine, and summary of state practice, is A. Vamvoukos, *Termination of Treaties in International Law: The Doctrines of Rebus Sic Stantibus and Desuetude* (Oxford, 1985). For the legislative history of Art. 62 of the Vienna Convention on the Law of Treaties, which most writers believe codifies the current practice on the change of circumstances, see 1. Sinclair, *The Vienna Convention on the Law of Treaties*, 192-196 (2d ea., Manchester, 1984) and the list of references in S. Rosenne, *The Law of Treaties: A Guide to the Legislative History of the Vienna Convention*, 324-327 (Oceana, 1970).

15. A.A. Cançado Trindade, *The Application of the Rule of Exhaustion of Local Remedies in International Law*, 213 (1983).

16. *Id.* at 213-249. Cançado Trindade analyses in detail the temporal aspects of the six-month rule of the European Convention on Human Rights.

17. Most expositions on the temporal dimension of private international law have focused on issues raised by changes in a forum's conflicts rule, changes in substantive law, and changes in the connecting factor. See J.H.C. Morris, *The Conflict of Laws*, 493-503 (3rd ea., Stevens, 1984); A. Dicey and J.H.C. Morris, *The Conflict of Laws*, 51-63 (10th ea., Stevens, 1980); J. Grodecki, 3 *Int'l Encyclopedia of Comparative Law*, ch. 8 (1975). The Institut de Droit International has considered the issue of changes in rules of private international law over time. 59 *Annuaire de l'Institut de droit international*, 246 (1982, Part II) 58 *Annuaire de l'Institut de droit international*, 77 (1979, Part 1).

18. See "The Problem of Choice of Time in Private International Law," 58 *Annuaire de l'Institut de droit international*, 1-96 (1979, Part 1).

19. "The problem of choice of law in private international law," Resolution adopted 29 Aug. 1981, 59 *Annuaire de l'Institut de droit international*, 246-251 (1982, Part 11). The Commission previously held extensive discussions on the problem. 58 *Annuaire de l'Institut de droit international*, 1-96 (1979, Part 1). See also the report prepared for the

Commission by M. Max Sorensen, "Le problème du droit intertemporel dans l'ordre international," 55 *Annuaire de l'Institut de droit international*, 4 (1973, Part 1).

20. For cases in the civil law tradition, see J. Grodecki, 3 *Int'l Encyclopedia of Comparative Law*, ch. 8 (1975).

21. For the common law tradition, see A. Dicey and J.H.C. Morris, *supra* note 17.

22. United Nations Charter, 26 June 1945, 59 Stat. 1031, T.S. 993.

23. Sixth proclamation in the preamble, Stockholm Declaration of the United Nations Conference on the Human Environment, U.N. Doc. A/Conf. 48/14 (1972).

24. *Id.* at preamble.

25. Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft, 15 Feb. 1972, 26 U.S.T. 2403, T.I.A.S. No. 8165; Convention on International Trade in Endangered Species of Wild Fauna and Flora, 3 Mar. 1973, 27 U.S.T. 1087, T.I.A.S. No. 8249; Convention Concerning the Protection of the World Cultural and Natural Heritage, 23 Nov. 1972, 27 U.S.T. 37, T.I.A.S. No. 8226.

26 See, e.g., the Barcelona Convention, the preamble of which notes that the states are acting because they are "fully aware of their responsibility to preserve this common heritage for the benefit and enjoyment of present and future generations." Convention for the Protection of the Mediterranean Sea Against Pollution, and Protocols. 16 Feb. 1976, 15 *I.L.M.* 290 (1976).

27. For a review of the extent to which international agreements concerned with conservation of natural and cultural resources contribute to the protection of future generations, see E Brown Weiss, "The Planetary Trust: Conservation and Intergenerational Equity," 11 *Ecol. L. Q.*, 495, 540-563 (1984). For analysis of the common heritage of mankind in relation to future generations, see B. Nagy, "Common Heritage of Mankind: The Status of Future Generations" (mimeo, Budapest, 1988).

28. The World Charter for Nature, *adopted* by the United Nations General Assembly, 9 Nov. 1982, G.A. Res. 37/7, 37 U.N. GAOR Supp. (No. 51) at 17, U.N. Doc. A/37/51 (1982).

29. The Nairobi Declaration, 18 May 1982, U.N.E.P. Report of the Governing Council. 37 U.N. GAOR Annex 2, Supp. (No. 25) at 49, U.N. Doc. A/37/25 (1982).

30. Ministerial Economic Declaration, Group of Seven, *N.Y. Times*, 12 July 1990, p. A15, cols. 1-5.

31. Bergen Conference, Ministerial Declaration on Sustainable Development, 20 *Env'l Pol'y & L.*, 100 (1990).

32. For a skeptical analysis of the principle, see D. Bodansky, "The Precautionary Principle: Scientific Uncertainty and International Environmental Law," *Proceedings, 199/ Annual Meeting of American Society of International Law (ASIL, 1992)*.

33. The parties indicated that in implementing the London Dumping Convention they would be guided by a "precautionary approach," in which preventive measures would be taken when there is reason to believe the dumped material is likely to cause harm even where there is no conclusive evidence to prove a causal link to certain effects and agreed that in implementing this approach they would be guided by certain specific measures. LDC 14/ WP.7, Annex (1991).

34. The term "preservation" is traditionally associated with saving nature for its own sake, rather than for its usefulness in fulfilling later human needs, which is associated with "conservation." See J. Passmore, *Man's Responsibility to Nature, III* (Scribner, 1974). For a critique of "preservation" and "conservation," see B. Norton, "Conservation and Preservation: A Conceptual Rehabilitation," 8 *Env. Ethics*, 195 (1986).

35. The Stalinist model of economic development, as epitomized by the Five-Year Plans in the 1930s, required the people to sacrifice the benefits of consumer goods and services in order to further the rapid industrialization of a poor country. The agricultural sector was collectivized and elemental needs of citizens were neglected to achieve the high rate of forced savings and investment necessary to finance heavy industry. See, e.g., D. MacKenzie and M.W. Curran, *A History of Russia and the Soviet Union*, ch. 34 (2d ea., rev., Dorsey Press, 1982); for a more detailed account of the period, see A. Nove, *An Economic History of the U.S.S.R.* (Allen Lane, 1969).

36. The Calvinist society put a premium on thrift and sobriety, valued effort and diligence, and encouraged the accumulation of the fruits of one's labour instead of the immediate enjoyment of them. See J. T. McNeill, *The History and Character of Calvinism* (Oxford, 1954). The theology of Calvin is said to have contributed to the development of Western capitalism. The classic exposition of this idea is Max Weber, *The Protestant Ethic and the Spirit of Capitalism* (originally appeared in German in 1904, rev. in 1920, English trans. 1930, Scribner, 1958); see also R.H. Tawney, *Religion and the Rise of Capitalism* (J.M. Murray, 1926). For more current views, see G. Poggi, *Calvinism and the Capitalist Spirit* (U. Massachusetts, 1983).

37. See H. Barnett and C. Morse, *Scarcity and Growth*, 11-12 (Johns Hopkins, 1963).

38. J. Simon, *The Ultimate Resource* (Princeton, 1981).

39. In *Fairness to Future Generations*, *supra* unnumbered note on p. 385.

40. The theory also applies to cultural resources, since they form an integral part of the legacy we give to future generations and are linked to our role as a member of the natural system. See *id.*

41. E. Burke, "Reflections on the Revolution in France," 130-140 (1790), in 2 *Works of Edmund Burke*, 368 (London, 1854; Reprint Services, 1987).

42. See J. Rawls, *A Theory of Justice* (Belknap Press, Harvard, 1971).

43. In *Fairness to Future Generations*, *supra* unnumbered note on p. 385. at 25-26.
44. See *Islamic Principles for the Conservation of the Natural Environment*, 13-14 (IUCN and Saudi Arabia, 1983).
45. *Id.* at 13.
46. See M. Khadduri, *The Islamic Conception of Justice*, 137-139, 219-220, 233-239 (Johns Hopkins, 1984).
47. *Genesis* 1:1-31, 17:7-8. "I will maintain my Covenant between Me and you, and your offspring to come, as an everlasting covenant throughout the ages, to be God to you and to your offspring to come. I give the land you sojourn in to you and to your offspring to come, all the land of Canaan, as an everlasting possession. I will be their God." *Genesis* 17:7-X.
48. J. Locke, "An Essay Concerning the True Original, Extent and End of Civil Government." *Second Treatise on Civil Government*, pars. 25, 31, 33, 37, in *Social Contract* (Sir E. Barker, 2nd ed., Oxford, 1979).
49. R. Dolzer, *Property and Environment: The Social Obligation Inherent in Ownership* (IUCN, 1976).
50. The U.S. Constitution reserves such powers for the states. "The owners not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." U.S. Const. Amend. X. See Garton, "Ecology and the Police Power," 16 *S. D.L. Rev.* 261 (1971).
51. "Selbst eine ganze Gesellschaft, eine Nation, ja alle gleichzeitigen Gesellschaften zusammengenommen sind nicht Eigentüemer der Erde. Sie sind nur ihre Besitzer, ihre Nutzniesser, und haben sie als *bond patres familial* den nachfolgenden Generationen verbessert zu hinterlassen." Karl Marx, *Collected Works* (1985).
52. Attributed to Nan Sir Ofori Atta. N.A. Ollennu, *Principles of Customary Land Law in Ghana*, 4 (Sweet & Maxwell, 1962). For discussion of relationship between generations, see also A. Allott, *Essays in African Law*, 70 (Greenwood Press, 1975).
53. See, e.g., 1. Schapera, *A Handbook of Tswana Law and Custom* (F. Cass, 1970); X. Vlanc Jouvan, "Problems of Harmonization of Traditional and Modern Concepts in the Land Law of French-Speaking Africa and Madagascar," *Integration of Customary and Modern Legal Systems in Africa* (Africana, 1971). L. Obeng, "Benevolent Yokes in Different Worlds," in *Global Resources: Perspectives and Alternatives*, 21-32 (C.N. McRostie, ed., University Park Press, 1970). Obeng notes that such observances are found among peoples in Africa, Asia, the Pacific, Papua New Guinea, and the American Indians.
54. J. Stewart-Smith, *In the Shadow of Fujisan* (Viking Penguin, 1987). The reverence for nature in Japan, for example, is transformed into important symbolic representations, such as flying cranes on wedding kimonos. See also F.S.C. Northrup, *The Meeting of East and West* (Oxford, 1949).

55. See F.S.C. Northrop, *id.* at 415-470.
56. See A. Scott, 3 *The Law of Trusts*, 228 (3rd ed., 1967, and Supp., Little Brown, 1982).
57. See T. Page, "Intergenerational Justice as Opportunity," *Energy and the Future* (D. Mac Lean and P. Brown eds., Rowman and Littlefield, 1982). Page has independently proposed that intergenerational justice have as its object the preservation of opportunities for future generations, which means preserving the "valuable parts." See also T. Page, *Conservation and Economic Efficiency* (Johns Hopkins, 1977).
58. See, e.g., *Diversity and Stability in Ecological Systems* (G. Woodwell and H. Smith, eds., Clearinghouse for Federal Scientific and Technical Information, Springfield, Va., 1969).
59. R. May, a Princeton University biologist, questions the generally accepted assertion that complexity always implies stability, a concept that is sometimes used interchangeably with robustness. R. May, *Stability and Complexity in Model Ecosystems* (Princeton, 1975); R. May, *Theoretical Ecology: Principles and Applications* (Blackwell Scientific, 1981).
60. See B. Norton, *Why Preserve Natural Variety?*, 73-97 (Princeton, 1987).
61. Conversation with Pablo Guttman an economist, Buenos Aires, Argentina, 11 June 1986.
62. Discussion with G. Gallopin, President, Fundación Bariloche, June 1986. This is consistent with the theories of catastrophe and of complex systems far from equilibrium. For catastrophe theory, see R. Thom, *Mathematical Models of Morphogenesis* (Halsted Press, 1983); for complex systems, see I. Prigogine and I. Stengers. *Order Out of Chaos: Man's New Dialogue With Nature* (Bantam, 1984).
63. J. Lovelock, *Gaia, A New Look at Life on Earth* (Oxford, 1979).
64. For a thoughtful analysis of group rights in relation to goods that are enjoyed together, see J. Waldron, "Can Communal Goods Be Human Rights?" (paper delivered at Conference on Development, Environment and Peace as New Human Rights, Oxford University, Oxford, England. 28-31 May 1987).
65. This has been referred to as Parfit's paradox and was developed in D. Parfit, "On Doing the Best for Our Children," in *Ethics and Population*, 100 (M. Bayles, ed., Schenkman, 1976) and D. Parfit, "Future Generations, Further Problems," 11 *Phil. & Pub. Aff.*, 113 (1982),
66. M. Khaduri, *supra* note 46 at 233 (1984).
67. It has been argued that if one accepts the model of rights as limited to individual rights, it is preferable to recognize general obligations toward the integrity of environmental systems rather than to discuss environmental protection in the framework of rights, since this framework cannot encompass such categories as future

generations, whose individual members are still contingent. B. Norton, "Environmental Ethics and the Rights of Future Generations," 7 *Soc. Theory & Prac.*, 319, 337 (1981).

68. The Cousteau Society has drained a Petition for the Rights of Future Generations, for which it is soliciting signatures around the world *See 19 Calypso Log*, 7 (February 1992)

69. See In Fairness to future Generations, *supra* unnumbered note on p. 385

70. See R. Norgaard, "Sustainability as Intergenerational Equity: The Challenge to Economic Thought and Practice (World Bank Report No. IDP 97, 1991) for discussion of methods for accomplishing this

71. World Commission on Environment and Development, *Our Common Future*, 332 (Oxford, 1987)

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