

## BIOETHICS AND ECOLOGY: TOWARDS “SUSTAINABLE BIOETHICS”\*

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### ABSTRACT

Sustainability has emerged not only as a global concept, but also as a principle and goal which includes a set of values. In despite of the international acceptance of the concept, there is a long path to be transited in order to establish a real consensus about its meaning and applicability.

The conceptual application of sustainability to Bioethics is more than a proposal about the extension of the topics that traditionally have been adjudicated to this new “discipline”.

The text attempts to assess the rationale implied in Bioethics questioning the disciplinary and inter-disciplinary approaches of its internal epistemology. This evaluation will take into consideration the actual frameworks developed from ecology and earth system analysis.

The main thesis to be sustained is that, in order to gain theoretical sustainability, Bioethics would need to adapt itself to a transdisciplinary approach. Following this suggestion, Bioethics will be able to face the actual requirements of a future society.

**Key words:** sustainability, bioethics.

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## **BIOÉTICA Y ECOLOGÍA: HACIA UNA “BIOÉTICA SOSTENIBLE”**

### **RESUMEN**

*La sostenibilidad ha surgido no sólo como un concepto global sino también como un principio y meta que involucra un conjunto de valores. A pesar de la aceptación internacional que posee el concepto, aún es largo el camino que debe transitarse para llegar a establecer un consenso real acerca de su significado y ámbitos de aplicación.*

*La aplicación conceptual de la sostenibilidad a la Bioética es más que una propuesta de extensión de su significado a los temas que tradicionalmente han sido asignados como propios de esta “disciplina”.*

*El presente texto pretende evaluar la racionalidad propia de la Bioética cuestionando los enfoques disciplinarios e interdisciplinarios de su epistemología interna. La tesis principal que se sostendrá es que, para ganar en sostenibilidad teórica, la Bioética requeriría adoptar un enfoque transdisciplinario. Siguiendo esta sugerencia, se considera que la Bioética podría estar preparada para enfrentar las exigencias reales de la sociedad futura.*

**Palabras clave:** sostenibilidad, bioética.

## INTRODUCTION

When Bioethics was proposed as a new concept by Potter, it was supposed to face the problem of the human race survival. Its later development has followed the path of a specialized discipline related to human health conforming what is called today Medical Bioethics. Meanwhile, the critical situations that were emerging in the 70's have been transforming into great global problems with increasing acceptance as problematic situations by academics, politicians and the public in general.

In order to properly focus on the discussion proposed in this paper, it seemed necessary to show how the current pattern of environmental and social degradation requires urgent changes in the way we are approaching them. The central idea is that we need to change paradigms and in this sense we need to transit from disciplinary to interdisciplinary bioethics projects with transdisciplinary attitudes. In this way it would be possible to build the bridge to the future.

What is the rol for the Legal system in these new global problems would be a question to be faced in following texts.

## FACING GLOBAL PROBLEMS

During the last thirty years, major global changes have been produced. According to the Living Planet Report 2000<sup>1</sup>, the state of Earth's natural ecosystems has declined by about 33%<sup>2</sup> and the ecological pressure of humanity has increased by about 50%, exceeding the biosphere's regeneration rate<sup>3</sup>.

The Report uses the "Living Planet Index" (LPI) and the "Ecological Footprint". The first one is "a measure of the change in the health of the world's natural ecosystems since 1970, focusing on the Earth's forest, freshwater and marine biomes as these contain most of the world's biodiversity"<sup>4</sup>. The second one, "measures a population's consumption of food, materials, and energy in terms of the area of biologically productive land or sea required to produce those resources and to absorb the corresponding waste"<sup>5</sup>.

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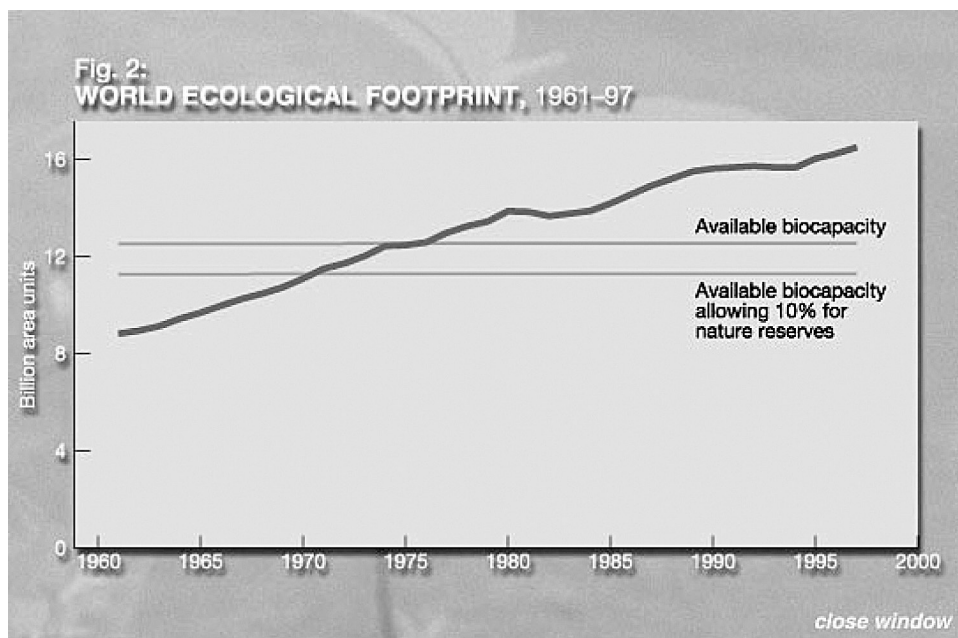
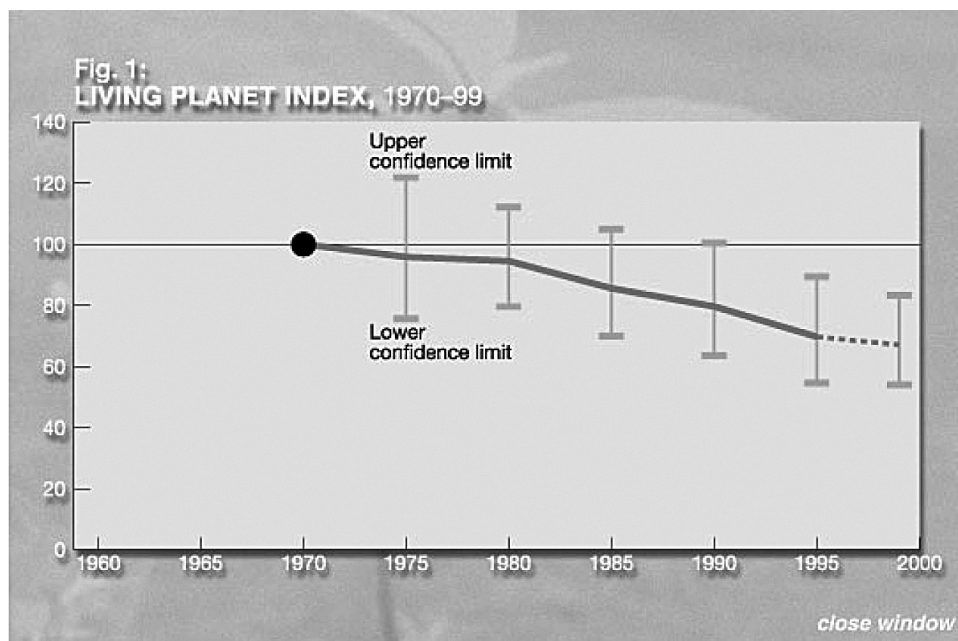
1 Issued by the World Wide Fund for Nature (WWF). See, WWF, 2000 at <http://www.wwf.org>

2 See figure 1.

3 See figure 2.

4 See, WWF 1998, 1.

5 See, WWF 2000.

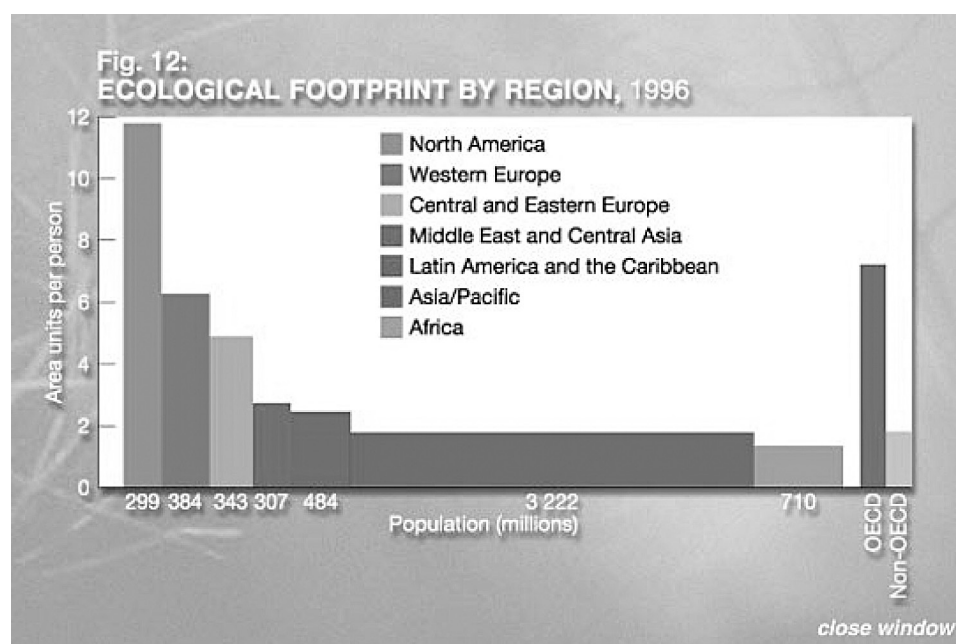


Following the results of the “Ecological Footprint” it can be concluded that humanity, as a whole, has passed the point at which it lives within the global regenerative capacity of the planet. As result, this fact is producing a progressive decline in the natural wealth of the world’s forest, freshwater and marine ecosystems.

The consumption patterns show a difference between the industrialized countries and the rest. In 1996, the ecological footprint of an average consumer in the industrialized world was “four times of an average consumer in the lower income countries”<sup>6</sup>. Figure 12 shows the size of the Ecological Footprint in seven regions of the world. The height of the box is proportional of the regions average area *per person*. The width is proportional to the population of the regions.

In 1996, 12.6 billion hectares were considered as biologically productive land, covering roughly one quarter of the planet’s surface<sup>7</sup>. By contrast, the world average footprint was 2.85 hectares per person. This overshoot is leading to a gradual depletion of the Earth’s natural capital stock.

Global warming produced by pollution is seen as a planetary risk with high impact on biodiversity and human health. Almost five billion tons of CO<sub>2</sub> are produced each year.



SOURCE: WWF 2000.

Carbon dioxide and other gases<sup>8</sup> are responsible for the so-called “greenhouse effect”. The consequences of such emissions on the global climate are becoming

<sup>6</sup> See WWF 2000.

<sup>7</sup> 1.3 billion hectares of cropland, 4.6 billions of grazing land, 3.3 billions of forest land, 3.2 billions of fishing grounds and 0.2 billion hectares of built-up land. See, WWF 2000.

<sup>8</sup> Including methane, nitrous oxide and clorofluorocarbons (CFCs).

increasingly visible. They “include changes in temperature, precipitation, sea level rise, atmospheric circulation patterns and ecosystems. For many areas on Earth these changes are becoming manifest through changes in the frequency and the intensity of extreme weather events”<sup>9</sup>.

The risks involved in climate change are global. “Besides gradual climate change and gradually increasing societal damage, a major additional risk is the possible destabilization of global climate that could occur as a result of stagnation of the Ocean Conveyor Belt, the collapse of the Antarctic Ice Sheet, or the release of more greenhouse gases as a result of the warming of the oceans and/or tundra areas. These are ‘low-probability, high-impact’ phenomena of major importance in the debate about climate change and policy measures to limit greenhouse gas emissions”<sup>10</sup>.

Political and economical interests are playing a key role in the debate. Under the Kyoto Protocol, drafted in December 1997, the international discourse on climate policy has been dominated by discussions on flexibility mechanisms-emissions trading, joint implementation and Clean Development Mechanisms (CDM). The United Nations climate talks held at The Hague (Netherlands) in November 2000 collapsed after several disagreements between the European Union and the United States<sup>11</sup>. Huge differences between those countries scuppered a deal in a meeting with 180 countries represented. The main disagreements were those related to the limited use of carbon sinks. European Union’s insistence in adopting domestic actions more than to obtain reductions by buying emission credits from other countries was refused by the United States.

Depletion of the ozone layer is also a global problem. First empirical evidence about this phenomenon was obtained in the 1980’s by comparing data gathered since 1957<sup>12</sup>.

9 VELLINGA AND VAN VERSEVELD, p. 3

10 VELLINGA AND VAN VERSEVELD, p. 36

11 Talks resumed in May 2001.

12 See, United Nations Environmental Programme (UNEP)- World Metereological Organization (WMO). UNEP-WMO 1994.

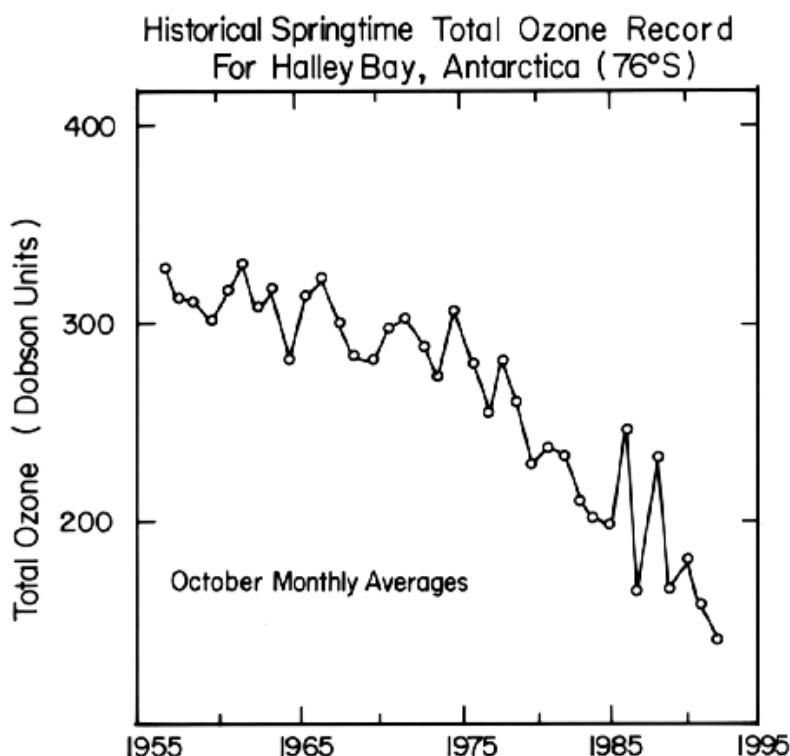


FIGURE 4. UNEP-WMO 1994.

A joint Expert Meeting gathered in May 1999 identified numerous technical options and management techniques for limiting emissions of ODS (Ozone Depleting Substances). The experts concluded that “while alternatives may not yet be technically and economically feasible for some current uses, there are technologies for other uses that can further reduce ODSs and global warming gases in the near future”<sup>13</sup>. Presentations and discussions at the Joint Expert Meeting “highlighted the complexity of the links between ozone depletion and climate change mitigation activities, the multiplicity of solutions required to address these two global change issues simultaneously, and the need for solutions tailored to regional and national needs”<sup>14</sup>.

13 TEAP (Technology and Economic Assessments Panel) and IPCC (Intergovernmental Panel on Climate Change). Meeting Report of the Joint IPCC/TEAP Expert Meeting on Options for the Limitation of Emissions of HFCs and PFCs. Petten, The Netherlands, July 1999. Conclusions. In <http://www.unep.ch/ozone/Joint-IPCC-TEAP-HFC-PFC.htm>

14 Ibidem.

It was also stressed in the same meeting that “[d]eveloping countries expressed concern that some developed countries may try to impose their own choice of technology on developing countries. Such efforts could undermine trust and mutual respect under the Protocol and would be counterproductive if developing countries would begin to question the advice given within the Montreal Protocol framework. Specifically, concerns were expressed that uncertainty on possible controls to address climate change may adversely affect compliance with Montreal Protocol obligations particularly for the refrigeration, air conditioning and foams sector. This could undermine credibility of future global environmental treaties. It is also essential that technologies chosen to address climate change and ozone protection meet the sustainable development goals of developing countries”<sup>15</sup>.

Global wealth distribution is uneven. Hunger afflicts one out of seven people on Earth. “Between October 1999 and October 2000, the number of people facing serious food shortages increased from 52 to 62 million, the largest increase (45%) being in sub-Saharan Africa, mainly in the Horn”<sup>16</sup>. “On average, the 826 million chronically hungry people worldwide need to consume between 100 and 400 more kilocalories per day. In some countries, the depth of hunger is much higher. (...) Strictly speaking, there are more chronically hungry people in Asia than in any other region, but the depth of hunger is greatest in sub-Saharan Africa. In 19 out of 46 sub-Saharan countries assessed, the undernourished have an average food deficit of more than 300 kilocalories per person per day”<sup>17</sup>.

World Bank assessment for 1999-2008 indicates that world economic growth will likely be higher (3.1% p.a.) than in the 1990s, but mostly on account of better performance in the industrial countries. “In many developing countries, progress in the fight against poverty is likely to fall short of the goal set by the international community, which calls for poverty to be reduced by half by 2005”<sup>18</sup>. Extreme poverty declined only slowly in developing countries during the 1990s: “the share of the population living on less than USD\$1 a day fell from 28 per cent in 1990 to 23 per cent in 1998, and the number of poor people remained roughly constant as the population increased”<sup>19</sup>. Estimations for year 2000, indicate that 2.8 billion people live on less than USD\$2 a day in developing countries<sup>20</sup>. For estimates of 5,011 million people in 1998 and 6,185 million people in 2015, the scenarios about poor people are as follows:

15 Ibidem.

16 FAO/GIEWS. Food Outlook n° 5. November 2000, p. 4

17 Food and Agricultural Organization (FAO). The State of Food Insecurity in the World (SOFI 2000).

In: <http://www.fao.org/news/2000/1002-e.htm>

18 WORLD BANK. Global economic prospects and the developing countries (1999).

In <http://www.worldbank.org/poverty/data/trends/income.htm>

19 WORLD BANK. Ídem. 2001.

20 Cfr. Ibidem.



**Table 4: Poverty in developing countries under scenarios of base case growth (scenario A); low case growth (scenario B); and 1990s average growth, 1990, 1998, 2015**

	\$1 a day		\$2 a day	
	<i>Headcount ratio (percent)</i>	<i>Number of poor (million)</i>	<i>Headcount ratio (percent)</i>	<i>Number of poor (million)</i>
<b>1990</b>	29.0	1,276	61.7	2,718
<b>1998</b>	23.4	1,175	56.1	2,812
<b>2015: scenario A (base case growth)</b>	12.6	777	36.7	2,272
<b>2015: scenario B (low case growth)</b>	16.4	1,011	43.2	2,672
<b>2015: growth as in 1990s</b>	18.7	1,157	47.5	2,938

Source: Global Economic Prospects and the Developing Countries 2001.

“The numbers show little progress in reducing income poverty over the last decade (...) and a large majority of poor people said they are worse off now, have fewer economic opportunities, and live with greater insecurity than in the past. Poor people describe repeatedly and in distressing detail what has only glimpsed before, the psychological experience and impact of poverty”<sup>21</sup>.

These global changes and situations, among others, in addition to their complexity, and maybe because of it, are steering the recognition of limitations in the way we have tried to understand them. First of all, they are becoming “real” problems and not only academic discussions. Despite the ignorance about their multiple causes, there is an increasing public awareness about the significance of human interference in their production or in the way people suffer their consequences.

In second place, their complexity is partly derived not only because their multiple causes but because their “de-location”. Vital experiences were circumscribed to the range of influence of individual actors. This fact does not seem to be true any more. Now, desertification in the sub-Saharan region is linked to climate changes thousand of miles far away and cyclones in the Caribbean are linked to ODS emissions in other regions. This “de-location” is confronting the limits of national approaches.

21 WORLD BANK. Poverty trends and voices of the poor. <http://www.worldbank.org/poverty/data/trends/index.htm>

These problems are requiring international cooperative actions in trying to solve them or at least to reduce their impacts.

Thirdly, their complexity is shown by the increasing concerns that “[t]here would be no way of answering such questions through the means of reductionist studies conducted within the narrow bounds of disciplinary eruditeness, local technocratic wisdom or the self-serving interpretations of pressure groups”<sup>22</sup>.

Fourthly, in addition to the interdisciplinary and international standpoints of view, these global changes and problems are requiring an “inter-objective” view. This view refers to the “intricate tangle of partially conflicting needs, intentions and interests of the actors involved (ranging from individuals to multi-national coalitions)”<sup>23</sup>. This recognition allows the understanding of the negotiation processes involved in the drafting of international agreements and could be useful to understand their achievements and failures.

And last, but not least, their complexity is derived from the fact that sentiments, ideologies, ethical and moral issues are deeply involved in the way the problems are understood, the questions are asked and the possible solutions are discussed. So, beyond inter-national, inter-disciplinary and inter-objective approaches the emerging question is for the human ability for integrating these complexities in a trans-disciplinary way, that is, a holistic approach which without seeking the elimination of the disciplinary and inter-disciplinary efforts looks for their complementarities and it is aimed to transcend their limitations. It is a recognition of the different, complex and complementary levels of reality.

## THE DISCIPLINARY EVOLUTION OF BIOETHICS

During these same thirty years Bioethics, as an emerging discipline, has obtained gradual and increasing worldwide recognition. Its novelty is not only referred to its topics but also to the term used by V.R. POTTER in his work “Bioethics: Bridge to the Future”.<sup>24</sup> However, the acceptance of the term has not implied an homogeneous development of its literature.

When Potter coined the term he was thinking a new science of survival which “would attempt to generate wisdom, the knowledge of how to use knowledge for social good from a realistic knowledge of man’s biological nature and for the

22 SCHELLNHUBER, H.J. “Discourse: Earth System Analysis. The Scope of Challenge”. In SCHELLNHUBER, H.J. and WENZEL, W. *Earth system analysis. Integrating science for sustainability*. Springer. Berlin, 1998. p. 6.

23 Ídem, p. 7.

24 POTTER, V.R. (1971) *Bioethics: bridge to the future*. Prentice-Hall.

biological world".<sup>25</sup> But his proposal was rapidly overwhelmed by the orientation of the Kennedy Institute<sup>26</sup> and its scholars who tried to establish Bioethics as a new disciplinary field. This orientation stressed the ethical concerns about medical issues and became the bioethical mainstream conceptualization.<sup>27</sup>

After the germinal proposals, Bioethics has experienced an increasing disciplinary development.<sup>28</sup> Near five hundred doctoral programs have included the Bioethical studies and more than fifteen thousand master programs worldwide have done the same academic decision, sometimes as an exclusive topic to be studied, others as one of the program components.<sup>29</sup> During this consolidation process, Bioethics has been urged to face significant questions related to its condition as new discipline. Maybe it is time for an evaluation of this development. Thirty years are only a short period considering the scientific evolution but it is just enough to reconsider the path and orientation we are giving to this new field of human knowledge.

The first field of questions is suggested by the term itself. Bioethics is etymologically conformed by the Greek words "Bios" and "Ethos". As a "new discipline" Bioethics had to define at least two basic questions in order to establish its identity: its field of study (its object) and the particular perspective of research (its method). The clue was found in the meaning of its original words. "Bios" means life and "ethos" was understood as an ethical perspective of study. So, "Bios" became the object of study and "Ethics" the way we had to approach life. But beyond this simplicity hard questions are involved. The decision had to involve the understanding of life and the linkage between "ethos" and "Bios". In Potter's perspective, "Bios" was understood as Life in the most general meaning. But Ethics had already defined its object, that is, the human conduct in order of justification. It is not surprising that a restriction to the term "Bios" was included when it was proposed not to consider the wide concept of Life but the more restrictive of "Human Life". In this perspective, Bioethics became the discipline that studied the human interventions in human life from an ethical perspective.

It was, and indeed it is, a fertile field of research. Human interference in the process of human life were rapidly adopted into the Bioethical discussions. Abortion

25 POTTER (1971), p. 26.

26 The Joseph and Rose Kennedy Institute for the Study of Human Reproduction and Bioethics, now called the Joseph and Rose Kennedy Institute of Ethics.

27 Works like Bibliography of Bioethics, Encyclopedia of Bioethics, Contemporary Issues in Bioethics and Principles of Biomedical Ethics gained wide recognition and contribute to the public acceptance of a new field of research.

28 For example, it is possible to find more than 230.000 WebPages on internet where the concept is used.

29 To verify this information use any search machine on internet linking Bioethics and doctoral or master degrees.

and Euthanasia were, and still they are complex issues of discussion and they are related to the human conduct in the two most significant stages of human life: its beginning and its final limit. But human life is not only a problem of existence but also a problem of quality and maintenance. In this way, “health” and “disease”, “medical care” and medical decisions related to these topics were introduced as pertinent fields of Bioethical studies.

In 1978, Louise Brown was the first babe born after the application of an “In Vitro Fertilization” (IVF) procedure. It was a concrete demonstration of the open possibility of scientific interference in the human reproductive process. The term “test-tube baby” became popular and it signified a new field of study for Bioethics. Something similar had occurred with the human genetics developments. Experimentation with human beings in this field, as it is possible to evaluate, discuss and decide from an ethical perspective, was also considered as a fertile line of bioethical research. All of these scientific interventions in human life have a social, academic and professional niche in Medicine and other Health professional disciplines. The disciplinary development of Bioethics emerged with a close linkage to the discussions they had established in their deontological perspective and due to this reason sometimes it was no easy to distinguish between Medical Deontology and Bioethics. Relationships between health professionals and patients, discussions about permissible risks and informed consent, “Lex Artis” and medical liability were issues involved in this line of Medical Bioethics and allowed to congruently think about the introduction of legal matters in Bioethical studies. This fact will be further analyzed. For now, it is significant to stress how Bioethics disciplinary development was produced due to the new scientific problems it had to face not only in the theoretical field but also in the practical one, that is, in the field where Ethics has a practical role to perform in order to adopt a decision before specific and individual cases.

As discipline, Bioethics has been understood as an **applied** field of knowledge in two different ways. First, as an “Applied Ethics” which means that Bioethical development is dependent of the inner discussions, theories and schools of thought that exist at the interior of Ethics as discipline. The various and not always compatible ethical positions and schools has been reflected in Bioethics. In this sense, positions as “consequentialism”<sup>30</sup>, “Virtue Ethics”<sup>31</sup>, “principlism”<sup>32</sup>, the “communitarian”<sup>33</sup> or the “feminist” approaches to ethics has found a correlate development in

30 See, e. g., KAGAN, SHELLY. *The limits of morality*. Oxford University Press, New York. 1989.

31 See, e. g., GEACH, PETER. *The virtues*. Cambridge University Press. New York. 1977.

32 See, e. g. BEAUCHAMP, TOM and CHILDRESS, JAMES. *Principles of biomedical ethics*. 4<sup>th</sup> ed., Oxford University Press. New York. 1994.

33 See, e. g., CALLAHAN, DANIEL. “Communitarian bioethics: a pious hope?” *The responsive community*, 6 (4). 1996. pp. 26-33.

Bioethics. Today, it could be stated that there are so many Bioethics as ways we have to understand Ethics and maybe more if we consider their progressive trend to specialization. The second way to view Bioethics as an "Applied knowledge" is related to the application of theory to cases. "Casuistry" or case-based reasoning has focused the complex issues involved in this dimension. The complexity implied in solving cases determined an interdisciplinary work in order to make decisions and this, on its turn, determined the participation of different professionals in the decision-making process. Psychologists, psychiatrist, sociologists and lawyers, among other professionals, became important in order to establish interdisciplinary groups in order to make or to counsel bioethical decisions. Because of this reason, an interdisciplinary approach to Bioethics became significant and opened a new field of discussions in the way Bioethics is construed.<sup>34</sup>

### **AN ASSESSMENT OF THE DISCIPLINARY VISION: THE "ONE WAY BRIDGE"**

Despite this new need of interdisciplinary Bioethical considerations, the disciplinary vision is still the driven one. I would like to point out some of its limitations in order to suggest an assessment of its future evolution.

Potter used the image of the "bridge to the future" in order to justify Bioethics. After thirty years we have partially transited that bridge in **one way**: from "Ethics" to "Bios". This way of transiting has produced significant results but also has some important limitations.

In first place, the attention must be directed to the imposed restrictions related to the object. The starting point for this evaluation must be the acceptance of its accomplishments. The discussions, even considering that they have not created a real consensus, have been significant to an increasing range of real problems lived in the field of Medicine and other health professions. Bioethics is recognized today as pertinent in discussions as human cloning, cancer and AIDS treatments and some other problems our societies are experiencing with a notorious level of public concern. In this sense the evolution has been useful. International congresses and expert meetings worldwide are considering Bioethical issues; it has been established the need of Bioethical Committees to counsel government policies, health institution boards and academic programs. But the restriction imposed when "Bios" was interpreted as only related to human life is artificial. If Bioethics has something to say in relation to the global problems we are currently facing the restriction is not sustainable any more.

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<sup>34</sup> For example, these problems have allow for a risen question about consensus, and the application of making-decision processes developed in other disciplines as Politics and Sociology.

In second place, and in relation to the previous problem, it could be argued how following Potter's suggestions environmental problems are now included into Bioethical discussion. There is indeed an increasing literature linking Ethics and Environment. But the "one way" restriction is still working. We are asking Ethics about these problems and acting in such a manner we are maintaining an implicit restriction in the way we ask the questions and we understand the problems. Doing so, we are imposing an overwhelming task for a discipline which does not have all the answers. Furthermore, we are maintaining the assumption that these are rational problems and that the way we have tried to understand humankind and the world is exclusive.

In third place, we are experiencing subjective and communicational problems derived from the "one way" transit. Subjective restrictions in the sense that "ethics" has found academic niches and institutions and only some well prepared individuals have real access to Bioethical discussions.<sup>35</sup> Gradually, the Bioethical discourse have been experiencing a separation of real life for the most part of the individuals in the planet, becoming another discipline in the multiple array of specializations and sub-specializations that is leading to a progressive fragmentation of human knowledge. The current situation could be viewed as a new "Babel" where real communication between disciplines and between Bioethical schools and institutions is extremely difficult if not impossible. A external witness of a Bioethical discussion frequently will have the impression of a talking where it is not clear if the people involved is focusing on the same topic. The image obtained is like a bridge with multiple lanes but without communication among them.

The suggestion is not in the sense that these are the only limitations of the disciplinary approach to Bioethics. Let us explore some other limitations of the interdisciplinary approach.

### **THE INTERDISCIPLINARY APPROACH TO BIOETHICS: THE "TWO WAY BRIDGE"**

The rationale implied in an interdisciplinary approach to Bioethics has the advantage that it could serve in the task of solving some of the identified problems. The image is now of a bridge that can be transit in two directions: from "Ethics" to "Bios" and also from "Bios" to "Ethics". If something real new was implied in the "bridge" image used by Potter is the implicit proposal that it seems possible to make a fusion of rationalities. The separation between "natural sciences", "human sciences" and "humanities" is not a question of impassable frontiers.<sup>36</sup> Considering

35 The bulk of Bioethics literature is still written by individuals. Mainly philosophers or writers with an academic background in philosophy.

36 See, e. g., WALLERSTEIN, I. Abrir las Ciencias Sociales. Informe de la Comisión Gulbenkian para la

the possibility of linking biological sciences with other sciences or disciplines, the "two way" bridge is illustrated by the emergence of interdisciplinary fields of study such as Biopolitics, Biolaw, Biosociology, Biomedicine, Biophysics, Bioeconomics or Biohistory. Even if some these "new" fields have emerged into the "one way circulation" paradigm there is a recognition about the mutual implication that these attempts have produced in the disciplines involved. In interdisciplinary research is frequently creating a fusion not only of matters but also of methodologies. A lesson from these new fields to Bioethics is how the "two way" is not a contradiction in terms.

In this sense, a challenge for Bioethics is to transit the bridge in the other way. That is, to look for lessons in the development, topics and methodologies used in biological sciences in order to construct a real interdisciplinary work. Consequently, the question of this Round Table about *Bioethics and Ecology* can obtain a different dimension.

According to the "one way" paradigm, the relationship between Bioethics and Ecology faces the question for the restriction of the object. At the moment one admits this relationship it seems clear that the restriction must be overruled. The acceptance of the possibility of including ecological issues in Bioethics, without losing congruence or coherence in the Bioethical discourse, implies that a "medical Bioethics" is only one of the alternatives to develop Bioethics. And to face some of the global problems we have identified, this relationship can be properly justified. In this envisioning, ecology becomes an additional and significant field of study from an ethical perspective.

The "two way" suggestion allows other arisen questions. How, for example, is it possible that Ethics could be transformed by the biological reasoning? How to make compatible ethical and biological methodologies? Is it possible? Needless to say that for some people the only fact of introducing these kind of questions could signify a motive of intellectual scandal. But the relationship between Bioethics and Ecology could serve as an example of this possibility.

As first step, let me suggest to make an inversion in the words. If we see the relationship between Ecology and Bioethics, with the emphasis in the first as we do in a "one way" paradigm, proposals as "deep ecology"<sup>37</sup> could serve to the purpose of transiting the bridge in the inverse direction. Interconnectivity and interdependency are crucial concepts developed in the study of ecosystems. The envisioning of living systems as a "web of life"<sup>38</sup> is a call for new ways of understanding, new

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reestructuración de las ciencias sociales. Siglo XXI, México, 1997. Second edition in Spanish.

37 See, e. g., NAESS, ARNE. *Ecology, community and lifestyle*, Cambridge, 1989.

38 See, e. g. CAPRA, FRITJOF. *The web of life*. Anchor Books, New York, 1996.



values and a new paradigm perfectly compatible with the Bioethical perspective. This new ecological paradigm implies a change from anthropocentric to ecocentric foundations; a recognition of the inner value of all forms of life as components of ecological communities linked in a web of interdependencies. A deep ecological perception implies the emergence of a new ethical system<sup>39</sup> compatible with the need of solving global problems.

The relationship between bioethics and ecology is deeper than a new field of study. Sustainability, for example, becomes not only a new topic for Bioethics but a way how Bioethics could be developed in the next future. Let us explore the suggestion implied in the title of this paper.

“Sustainability” gives an idea of conservation and maintenance of a state or situation. An ecological finding is that the conservation of a living system is only possible through permanent changes. Without changing, living systems collapse and disappear. In this sense change and conservation do not appear as opposite concepts because they are mutually required.

As in the case of change and conservation, the concept of “dissipative structures”<sup>40</sup> has allowed to understand how order and disorder are compatible. In points of great instability<sup>41</sup> dissipative systems<sup>42</sup> can create new structures which allow the system to maintain itself. These changes depend on the system history and its inner structure and relationships. “Dissipative structures” could be applied to the human knowledge in general and to Bioethics in particular. As a cognitive system, far from equilibrium, in bifurcation points as the present the system can change through the creation of new structures. A difference with living systems is that this bifurcation point must be recognized by the feed-back loops. Only with this recognition of instabilities, the system is able to the change.

The urgent question derived from the ecological problems is how to produce changes in our thoughts and values in a way that they could reconcile humans and Nature in a global highly stressed ecological system. If we want Bioethics, as a conceptual system, to become *sustainable* it should be transformed. To be transformed, we need to perceive its instabilities. To perceive its instabilities we need to strength its feedback loops. To strength its feedback loops we need to work

39 See CAPRA (1996), pp. 32 ff.

40 The concept was coined by Ilya Prigogine. See, e. g., PRIGOGINE, IYA. “Dissipative structures in chemical systems” in: Stig Claesson (ed.), *Fast reactions and primary processes in chemical kinetics*, Interscience, New York, 1967. Also, GLANDSDORFF, P. and PRIGOGINE, I. *Thermodynamic theory of structure stability and fluctuation*. Wiley and sons. London. 1971.

41 Bifurcation points.

42 Open systems far from equilibrium.



simultaneously in a variety of domains -public participation, conceptual structures, bioethical theories and especially bioethical education.

The epilogue of *The web of life*<sup>43</sup> is illustrative to determine the scope of the challenge. Living Systems Theory is able to provide a linking conceptual framework between ecological and human communities. What we could and we should learn is how to live in a sustainable way. This wisdom of Nature could be the essence of an "ecological literacy". Based on the understanding of ecosystems as autopoietic and dissipative structures it would be possible to identify some principles in order to build sustainable human communities.

Those principles are:

1. Inter-dependency;
2. The cyclic nature of ecological processes (recycling);
3. Association and Co-operation,
4. Flexibility; and
5. Diversity.

Sustainability is a consequence of all of them and the remaining question is how Bioethics would be able to assume them in its future development.

### **THE TRANSDISCIPLINARY APPROACH. THE "MULTIPLE WAY BRIDGE"**

By the year 1987, there were 8.530 definable knowledge fields. This has been the result of both increasing specialization and interdisciplinary overlaps.<sup>44</sup> This situation is steering to a progressive fragmentation of knowledge. Transdisciplinarity has been proposed as a way to solve the fragmentary and hyper specialized knowledge. Disciplinarity, pluridisciplinarity, interdisciplinarity and transdisciplinarity are construed as four arrows of a single bow: knowledge. The guide to understand them is more a complementation than an opposition; due to this reason, it cannot be understood as an anti-disciplinary project.

The "two way approach" has to overcome subjective and theoretical risks. From the subjective perspective the challenge is to fulfill the requirement of interdisciplinary subjects to adequately perform the interdisciplinary project. Interdisciplinarity is not a possibility opened for everyone and only individuals

43 See, CAPRA (1996) pp. 307 ff.

44 See CRANE, DIANA and SMALL, HENRY. "American Sociology since the Seventies: the emerging Crisis in the Discipline" in: *Sociology and its publics: the forms and fates of disciplinary organization*. TERENCE HALLYDAY and MORRIS JANOVITZ (ed.), University of Chicago Press, 1992. p. 197.

able to open their mental structures to other disciplines could be candidates for conforming interdisciplinary groups. The interaction between disciplines is not innocuous because the conceptual and methodological trade-offs usually arise questions about the consistency or coherence of the own paradigms. On the other hand, interdisciplinarity has to deal with the inner limitations of the disciplines involved. It is easy to speak about disciplines but a deeper consideration will show their heterogeneity until the point that the different schools and positions that exist in every discipline must be considered in a separate way. Unfortunately, not all the schools and positions allow the interdisciplinary work. Furthermore, only some schools and positions could be included in single interdisciplinary projects because it is also possible to identify how some of them result incompatible with their partners positions in the interdisciplinary research. In other words, not all the positions in economics, psychology or ecology could be considered as compatible in order to be joined in an interdisciplinary research. The same could be said of the ethical schools and position in relation to the ones existing in ecology.

But the deeper limitation of the interdisciplinary approach to Bioethics is generated by the fact that is not granted the exclusive role of our rationality in order to solve our global problems. Our world vision is a result not only of our scientific knowledge but also the consequence of other forms of knowledge. Religion, art, myths, literature, poetry and other spiritual experiences signify the existence of other levels of reality, other logics and narratives beyond the scope of scientific consideration. Despite its advantages over the disciplinary approach, interdisciplinarity is also a limited project.

In November 1994 it was held in Portugal the First World Congress on Transdisciplinarity. One of its results was an agreed "Charter of Transdisciplinarity" in which the complementary vision of human knowledge is stressed.<sup>45</sup> Article 3 states: "Transdisciplinarity complements the disciplinary approach. Out of the dialogue between disciplines it produces new results and new interactions between them. It offers a new vision of nature and reality. Transdisciplinarity does not seek a mastery in several disciplines but aims to open all disciplines to what they have in common and to what lies beyond their boundaries". And in Article 6 it can be read: "In relation to interdisciplinarity and multidisciplinary, transdisciplinarity is multireferential and multidimensional. While fully recognizing the various approaches to time and history, transdisciplinarity does not exclude a transhistorical horizon". Article 2 states that "The recognition of the existence of different levels of reality governed by different types of logic is inherent in the transdisciplinary attitude. Any attempt to reduce reality to one single level governed by a single form of logic is incompatible with transdisciplinarity".

45 See the "Charter" at <http://perso.club-internet.fr/nicol/ciret/english/charter.htm>

A transdisciplinary approach is a way to transcend the field of sciences by encouraging them to communicate and be reconciled with not only the humanities and the social sciences but also with other forms of knowledge.<sup>46</sup> This is a transdisciplinary attitude that looks for integration and complementation.

It is not an easy task to imagine a "multidirectional bridge" but it is a more adequate image considering the principles of "ecoliteracy". Our "Bridge to the future" is to be constructed. It does not already exist and it is not an simple task. It is necessary to recognize its complexity and to accept the need we have to start building it.

"Sustainable Bioethics" has a significant role to perform in this work. We do not how much time do we have to perform this task. What we do know is that our time is reduced by our life. On behalf of future generations we have to assume that there is still possible to create "sustainable knowledge" with a transdisciplinary attitude.

In the scope of a discussion about "Universal Values and the Future of Society", the new values involved in Ecology are justified for the simple fact that we need universal values because we are aware that we have to share a single planet. We are part of an entire living system and we need to open new ways to comprehend it. Only then, we could consider our knowledge as a sustainable one.

## BIBLIOGRAPHY

- BEAUCHAMP, TOM and CHILDRESS, JAMES. *Principles of Biomedical Ethics*. 4<sup>th</sup> ed., Oxford University Press. New York. 1994.
- CALLAHAN, DANIEL. "Communitarian Bioethics: A Pious Hope?" *The Responsive Community*, 6 (4). 1996.
- CAPRA, FRITJOF. *The Web of Life*. Anchor Books, New York, 1996.
- CRANE, DIANA and SMALL, HENRY. "American Sociology since the Seventies: the emerging Crisis in the Discipline" in *Sociology and its publics: The Forms and Fates of Disciplinary Organization*. Terence Hallyday and Morris Janovitz (ed.), University of Chicago Press, 1992. p.197
- Fao/GIEWS. Food Outlook N. 5. November 2000
- Food and Agricultural Organization (FAO). The State of Food Insecurity in the World (SOFI 2000). In: <http://www.fao.org/news/2000/1002-e.htm>
- GEACH, PETER. *The Virtues*. Cambridge University Press. New York. 1977.
- GLANDSDORFF, P. and PRIGOGINE, I. *Thermodynamic Theory of Structure Stability and Fluctuation*. Wiley and sons. London. 1971.
- KAGAN, SHELLY. *The Limits of Morality*. Oxford University Press, New York.1989.

46 See article 2 of the "Charter".

- NAESS, ARNE. Ecology, Community and Lifestyle, Cambridge, 1989.
- POTTER, V.R. (1971) Bioethics: Bridge to the Future. Prentice-Hall.
- PRIGOGINE, IYA. "Dissipative Structures in Chemical Systems" in Stig Claesson (ed.), *Fast Reactions and Primary Processes in Chemical Kinetics*, , Interscience, New York, 1967.
- SCHELLNHUBER, H.J. and WENZEL, W. *Earth system Analysis*. Integrating Science for Sustainability. Springer. Berlin, 1998. p.6
- Teap (Technology and Economic Assessments Panel) and IPCC (Intergovernmental Panel on Climate Change). Meeting Report of the Joint IPCC/TEAP Expert Meeting on Options for the Limitation of Emissions of HFCs and PFCs. Petten, The Netherlands, July 1999. Conclusions.
- In <http://www.unep.ch/ozone/Joint-IPCC-TEAP-HFC-PFC.htm>
- United Nations Environmental Programme (UNEP)- World Metereological Organization (WMO). UNEP-WMO 1994.
- VELLINGA, P. and VAN VERSEVELD. W. J. Climate Change and Extreme Weather Events. *World Wide Fund for Nature* (WWF): Gland, Switzerland. 2000. [http://panda.org/downloads/climate\\_change/xweather.pdf](http://panda.org/downloads/climate_change/xweather.pdf).
- WALLERSTEIN, I. Abrir las Ciencias Sociales. Informe de la Comisión Gulbenkian para la reestructuración de las ciencias sociales. Siglo XXI, México, 1997. Second edition in Spanish.
- World Bank. Global Economic Prospects and the Developing Countries (1999).
- In <http://www.worldbank.org/poverty/data/trends/income.htm>
- World Wide Fund for Nature (WWF). 2000 at <http://www.wwf.org>