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## **Sustainable Development, The Struggle Against Poverty And New Structures Of Governance In The Era Of Globalization**

### **1. Introduction and motivation**

"Can philosophical ethics still offer a way out of the ecological crisis?" - the German philosopher P. Kampits asked himself in 1978. Up to the present time environmental ethics, in their various forms (ecological, utilitarian, Rawlsian, the ethics of rights), have demonstrated with mixed results how and why humanity's relationship with the environment may reasonably be held to be also a moral problem, a problem that implies a redefinition or extension of the concepts of duty and responsibility, and an alteration in the very image humanity has of itself and its relationship with nature. Effective in dismantling the barrier of indifference that until now mankind has placed between itself and nature, and breaking through the limitations of a claustrophobic anthropocentricity deaf to the problems of environmental integrity, environmental ethics remain impotent over establishing adequate criteria to choose an order of priorities for concrete issues. (1) Indeed, if the ethical perspective does not manage to affect the foundations of scientific economic thinking, not much can be expected of it. It is not hard to see why. For good or ill, for at least a couple of centuries, it is economic thought – with its double function of representation of reality, and provision of models of intervention to change that reality – that directs the choices of the various economic actors, and that guides decision-making in politics.

It must be recognized that the problem of ecology is first of all a problem of public *ethos*, hard to solve without bringing into dispute certain ways of organizing society, without questioning ourselves on the ways we live together and on the values held in civil society. In this precise sense, we should realize at once that economic theory is still quite inadequate to fully deal with questions like the environment. At the heart of this inadequacy lies the formalistic conception, that is still prevalent in economic discourse, with its claim to be able to solve every conflict and controversy by separating form and content and putting itself forward to seek laws and institutions that are "neutral", i.e. that do not presuppose any adherence to values or cultural assumptions, and are thus acceptable to all actors independently of the historical context in which they are operating.

But formalism is not just this. It is also the idea that a society can find its cohesion and identity in efficient "rules of the game", concerning the spheres of both income distribution and the formation of collective choices. One of the false necessities a certain tradition of thought has got us accustomed to is to see the terms describing independence and belonging, efficiency and justice, self-interest and solidarity, as alternatives: a strengthening of the sense of belonging is seen as a reduction of the subject's independence; progress in efficiency is seen as a threat to justice; improvements in the individual's interest as an enfeebling of solidarity. These antinomies have to be eliminated, because they are false. It is remarkable, but not to be wondered at, that it is precisely the subject of sustainable development that today forces the economist to rediscover the centrality of values in his/her scientific work. Which, it should be carefully noted, is never just a mere instrument to help us know reality, for if it is true, as I believe it is, that our beliefs concerning human nature contribute to the formation of human nature itself, and if it is likewise true that what we think of ourselves and our possibilities helps to determine what we aspire to become, then our economic theories on human behavior lead to changes in the ways we behave, and hence contribute to a greater or lesser extent to modify reality itself.

In what follows, I shall first be examining the way in which economics "discovers" the environment question. I shall then trace in a summary form the recent history of ecology as a problematic subject, starting from the Conference of the United Nations at Stockholm in 1972, right up to the Conference at The Hague of November 2000. The aim of this rapid historic reconstruction is to indicate how the lack of a holistic approach to environmental matters explains the systematic alternation of the official positions so far taken, which has

certainly not helped the birth, over the last three decades, of an adequate critical consciousness. Finally, I shall try to defend the thesis that the struggle against poverty and for sustainable development are two sides of the same coin. Which is to imply that the projects and strategies of intervention based on the separation of poverty and environmental quality issues are destined to fail. The essay closes with a proposal to set up a World Organization for the Environment, an agency deemed necessary to overcome the limits of unilateral measures as well as the objective difficulties of putting international treaties into practice.

## 2. Economics "discovers" the environment issue

Right from its beginnings as an independent scientific discipline, economics has focused on two central questions: how the social product is formed, and how it is distributed. The most important problems discussed by economics as a science over the last two centuries all lead, directly or indirectly, back to these two central themes. The new phase of economic development, concerning the transition from industrial to post-industrial society, has led to the gradual emergence of new, more urgent and decisive problems. Among these, the one most macroscopically obvious today involves the ecological limitations that weigh on the process of production, that was able to advance until some decades ago in a way substantially free from constraints. Nature was never actually presented as an absolute limitation: the scarcity of resources was of course a factor influencing the forms and rhythms of development, but the economic system, through its own mechanisms, managed to overcome the scarcity (of fertile lands, of certain minerals etc.), thanks to an intense flow of technological innovations that removed the bonds of scarcity via productivity increases. For this reason, looking backwards to the process of industrialization, one has almost the impression of a dizzy growth towards unlimited plenty, as if nature was not hostile and niggardly, as the ancients thought.

The contemporary picture is completely altered. Industrial growth involves "external" effects on the environment that if they could be held to be negligible, at the beginnings of the process, (and economists almost completely did neglect), later developments showed to be devastating: some indispensable natural resources such as air and water have been degraded to an extent that has led to fears that the equilibrium of the biosphere itself may turn out to have been definitively altered by irreversible processes. We only have to think of the greenhouse effect, the gaps in the ozone layer, the effects on climate of the disappearance of the rain forests, the regulation of the chemical composition of the atmosphere, the fixation of solar energy and the conversion of raw materials: the great services the ecosystems provide, continuously, for the normal functioning of natural systems, are today at risk.

It is not just a question of decreasing returns, as some people insist on thinking. Without a more rigorous control of the effects of pollution caused by the economic system overall, the human race will risk extinction. Starting from the second half of the twentieth century, humanity's capacity for destruction has become a "biocide" phenomenon (Vigna, 2001) in the sense that for the first time, humanity sees itself as able to bend nature to its own ends, able not just to control it but to manipulate it. The moment has arrived to recognize that an ever-increasing production of goods and services is incompatible (*given* the known productive techniques, the present organization of the economy and the rate of increase of the population) with the safeguarding of the natural and urban environment. Above all, the moment has arrived to recognize that when humanity modifies the environment too rapidly (for example transforming the seas of oil from the earth's crust into gas in the atmosphere) it creates a situation in which the speed of these changes is superior to the speed of its own adaptation to them.

We should be asking ourselves whether the challenge of ecology does not only direct us, today, towards a politics of restructuring of the present methods of production, but above all towards finding new categories of thinking for a discipline – economics – for too long extraneous to this problematic field. Indeed, when public opinion began to become aware of the environmental question at the beginning of the sixties - the influence of Rachel Carson's *Silent Spring*, published in 1962, will certainly be remembered - the economists felt they were able to face up to the problem by using their own specific ways of thinking. However, the more influential subjects for the formation of public opinion were not quite up to focusing adequately on this, and hence passed on the idea that economics was synonymous with pollution, and the destruction of nature. Economics and ecology were thus seen as alternatives, as opposite poles, despite the fact that the common root of the two words links respectively government (the economy) and knowledge (ecology) of what happens in an *oikos*, i.e. in a "house", in a territory.

Yet, since the good management of anything has to be based on knowledge, the conflict between the two disciplines conceptually should not be possible.

What are the reasons for misunderstandings of this kind? In my opinion, the most significant is that when the economists believed (starting from the end of the sixties of last century) they should be involving themselves in ecological problems, they thought they could make use of the instruments of analysis specifically designed for the branch of the discipline known as public economics, in its turn born of the merging of the older welfare economics and the younger theory of social choice. What is there, the economists thought, at the bottom of the environmental issue? There is that, beyond the great variety of individual cases, resources are involved (land, air, water, species of animals, forests) that have some basic characteristics in common, whatever unit of measurement is applied to them. To be precise, these are resources that: 1) can naturally be regenerated; 2) are often common property; 3) their over-use can lead to irreversible damage, in the sense of their total exhaustion; 4) the existing stocks of these resources, and not only their flows, directly influence people's well-being; 5) the impact of economic activities on these resources is often cumulative and can be seen only after a certain stretch of time; 6) the environmental consequences of economic activities are basically uncertain ("hard" uncertainty in the sense that, as Vercelli, 1994, shows, environmental uncertainty cannot be dealt with by using the tools of the familiar theory of probability).

Now, the treatment at an analytical level of the problems in which resources of this kind appear, could be carried out - the economists thought - by starting from the two central notions of public economics: externality and public good. The economist could thus conclude that the much deprecated damage to the environment caused by economic activities were in the final analysis to be imputed to a typical "market failure", i.e. to the fact that in the presence of environmental resources market mechanism no longer guarantees, on its own, the achievement of that result of allocative efficiency that, from Adam Smith onwards, had been considered its most important virtue. Whence the recommendation to intervene to remedy the need, through a suitable system of taxes and subsidies, as C. Pigou (the inventor of welfare economics) had already suggested.

Of course, this translation of the environmental problem into economic terms by no means did justice to the complexity of meanings and intentions that the emerging ecological movement was developing. Above all the conceptualization of the environmental problem into the terms of a problem of externalities concealed a serious theoretical gap, briefly summed up as follows: the notion of externality, as the effect of the action of an economic agent on the welfare of other individuals that is not captured by the price system, is not a primitive notion. It depends, in fact, on the definition of economic actor and on the existence of markets. For example, if two companies operate in a way that the one damages the other, - the foundry that through its emissions of smoke damages the company nearby - an eventual merging of the two will mean that what beforehand were external effects now becomes a question raised within the same decision-making unit: the externality is internalized.

The point is that we can speak of externality only after an explanation has been provided for the number of economic actors and markets in existence. And since the number of firms and markets depends on very precise economic factors (non-convexity of production sets; transaction costs; access to information etc.), it turns out that only an analysis of general equilibrium that, starting from market fundamentals, determined endogenously the number of firms and markets, could be a conceptually satisfying way of dealing with the question of externalities. Which it isn't, given that the two conditions that allow us to identify the existence of externality are put forward axiomatically. To give an extreme example, if only one firm existed in the economy, there could be no externality. And yet, if this firm polluted and destroyed the non-renewable resources the integrity of the environment would turn out to be damaged just the same. Among other things, this simple consideration allows us to understand why in the countries of the ex-Soviet block, where there was certainly no market economy, the destruction of the environment was not at all inferior to that of western countries.

The conclusion has to be that economic science must, at the level of its very foundations rethink the relationship between humanity and nature, superceding the idea of a "humanity without constraints" that leads us to believe that any devastation is legitimate, in homage to certain anthropomorphic myths of omnipotence. (2) Rather, what is needed is the recovery of the basic recognition that humanity is part of nature, is internal to it, and has a cognitive exchange with nature, which is its necessary term. The relationship is of being born into it, and also of orderly change, because humanity, as part of nature, changes it: something inevitable

and also useful. But this must not mean destruction. The ideology of man the predator, according to which knowledge is used only to produce more, and more quickly, must be removed from the cultural horizon of the economist. (3)

### 3. Fairness and sustainable development

I set out from the by now familiar idea of sustainable development - a notion, however, not without its conceptual ambiguities. Whereas sustainability is a term that refers us to the idea of conservation of a particular state of nature, development is a term that implies the transformation into one form or another of that state. It is not without interest to recall that the expression "sustainable development" was originally chosen for reasons of political rhetoric. Today, it would be better to speak of intergenerational solidarity. Leaving aside questions of semantics, what I want to bring out here is that the plurality of meanings attributed to the notion of sustainable development is itself a symptom of a profound sense of unease at the conceptual level. As is well known, it is in the famous Brundtland Report of 1987 that this notion received what we may call its official formulation: "We mean by sustainable development a development capable of satisfying the needs of the present without compromising the capacity of the future generations to satisfy their own". But already a few years afterwards, the Nobel prize-winner Robert Solow published an essay (1993) in which he claimed that sustainability is a generic moral obligation of the present generation to future ones. He writes: "Insofar as it is a moral obligation, sustainability is a generic obligation, not a specific one. It is not an obligation to preserve this or that. It is rather the obligation to preserve the welfare capacity of those who come after us" (p. 187). From this it can be deduced that the destruction of natural resources is acceptable insofar as it is compensated for by investments capable of generating other goods or services able to increase welfare. In fact, this position of Solow goes back to 1974, the year in which the American economist, inserting a non-renewable resource into a standard model of inter-temporal growth, fixed a result that would afterwards become a basic reference point for the entire literature on sustainable development: a level of sustainable consumption can be guaranteed, in principle, every time it turns out to be technologically possible to guarantee a sufficient degree of substitutability between natural resource and physical capital.

For other writers, on the other hand, sustainability has to do with the property rights of future generations, an idea rendered by the phrase: "We have not inherited the earth from our parents; we are borrowing it from our children". This emotional phrase is often attributed to Ralph Waldo Emerson, though in actual fact its origin is by no means clear. (cf. Keyes, 1992). In any case, this point of view is firmly shared by Howarth (1992) and Norgaard (1992) who, though accepting Solow's idea of sustainability as a question of equity between generations, do not accept its reduction to a problem of substitutability between natural resources and produced goods such as capital goods. They start here from a consideration it is easy to share, that the fact that two goods are perfect substitutes for the present generation does not imply that they are so for future generations also.

Again for other scholars, sustainability would not involve considerations about issues of distribution between generations, but considerably more traditionally, questions of economic efficiency. Starting from the premise that most environmental goods admit two alternative uses - one destructive, according to which the environment is converted into a private good enjoyed by the present generation; and one as a public good, to be used also by future generations - Silvestre (1994) develops a model in which sustainability may be defined only in terms of the allocation of resources between generations. The interesting conclusion of the model is that, if the future generations are considered as being part and parcel of present-day society, allocative efficiency requires that environmental resources be maintained in their state of nature for a rather high number of decades. And all this, ignoring the principle that the living should inherit the earth from their parents, or that they borrow it from their children.

Well, whatever the approach one believes should be adopted, the relevance of sustainability to the wider question of the conflict between generations due to global environmental change will be obvious to everyone (cf. Tiezzi, 1993). Indeed, if the scarcity of natural resources and environmental degradation did not for one reason or another, constitute a serious threat to the well-being of future generations - as is postulated by the notion of sustainability - economists could happily ignore questions of fairness among generations and concentrate their attention just on problems of efficiency of inter-temporal

allocations. The great flowering of scientific publications in the seventies and eighties on the subjects of externalities and, more in general, of the market failures caused by the presence of environmental goods owes its *raison d'être* precisely to that.

A radical change of perspective can be noticed starting from the end of the eighties, as the awareness spread that environmental problems are global in scale, pervasive in their effects, and above all generators of important consequences for future generations. The global climatic changes, the reduction of the ozone in the atmosphere, and the irreversible damages to bio-diversity, present features that make the even quite elaborate approaches to sustainability up until that moment useless. This was for the simple reason that the actions of today determine potential costs for the future generations that are inherently unforeseeable, given the dynamics and complexity of ecological systems. For example, climatic change can jeopardize the subsistence agriculture in many areas of the world, just as it may increase the frequency and the dangers of tropical storms. Again, the gaps in the ozone layer could noticeably increase the risk of skin cancer after exposure to ultraviolet rays, etc. Faced with perspectives of this kind, it does not make sense to speak of sustainability of development in terms of generic guarantees offered to the future generations, so that these can satisfy their needs.

We thus succeed in explaining why, in recent years, it became obvious that the theoretical apparatus environmental economics had set out with was inadequate to deal with the "new" questions. Not only is Solow's model, and before that Hotelling's famous model of 1931 (according to which competitive markets would be able to induce firms to administer the stocks of non-renewable resources in such a way as to maximize the present value of profits) based on the assumption of perfect foresight. What is worse is that these models, as well as the literature on the so-called optimal growth, do not face up to the question of the institutional mechanisms necessary to realize a sustainable future. What institutions would be able to make private and social discount rates correspond so as to bring about Hotelling's equivalence result? More in general, what policies would be necessary to ensure that a path of sustainable development could be implemented? In addition, it is by now obvious that social and environmental problems are closely inter-linked. To be solved satisfactorily they must be dealt with together; so the assumption of *ceteris paribus* that characterizes the whole of the analysis of partial equilibrium turns out to be of very dubious usefulness (Norgaard, 1993).

This is the context of the on-going debate on sustainable development today, starting from a different perspective from that of the quite recent past. Some economists continue to believe that sustainability can be talked about adequately while remaining within the apparatus of cost-benefits analysis. For them, the institutions needed to ensure the internalization of environmental externalities, the efficient management of common property resources and the efficient inter-temporal allocation of resources are also sufficient to guarantee the rights of future generations. But a moment of reflection is sufficient to convince us that this is not the proper way to go about thinking of these things.

Cost-benefits analysis is very useful when we need to identify potential Paretian improvements - opportunities to improve the welfare of all without worsening the welfare of anyone. But - as we know - the prices and shadow prices on which the analysis in question is based depend on the initial endowments possessed by each agent. If these are assigned in a markedly distorted way, efficiency by no means guarantees the sustainability of the development - it may even make it worse. The objective of sustainability, in other words, requires a good deal more than improvements in efficiency in the Paretian sense. It requires the carrying out of policies that enable the realization of the transfer of goods and resources from one generation to another.

Two important consequences derive from this. In the first place, what makes the sustainability objective difficult are not just the famous market failures, but also and above all the various forms of distributive unfairness. Secondly, the way out cannot derive from cost-benefit analysis, precisely because it possesses the tools for solving problems of efficiency but not of fairness. So the pursuit of an objective like sustainable development also means taking into consideration political and ethical aspects. To put it another way, the horizon of efficiency is not wide enough to contain the issues raised by sustainability, which is first of all a problem of the definition of the rights of different generations. A proposition of this kind involves a quite weighty problem that has not yet received the attention it deserves. Let me clarify.

The vast literature on the subject under discussion, aside from the differences between individual writers, is founded on a shared theoretical scheme that runs as follows. On the one hand, it is assumed that all individuals are egoists, having self-interested preferences; on the other hand, that questions of fairness between generations are the concern of institutions or collective agents whose task is basically to operate transfers of

resources from the present to the future generations. However, a framework of this type contains a paradox: since the social choice function on whose basis decisions at a collective level are taken is rooted in individual preferences, why should the public decision-maker, let us say a government, take responsibility for the welfare of future generations if the individuals (of which that government is the expression, and to which it answers electorally) care nothing at all about this? On the other hand, if the economic actors had solidaristic preferences towards the generations to come, what need would there be for the intervention of a government to carry out transfers of resources to the future generations?

As is well known, in economics the traditional way to dissolve paradoxes of this kind is to assume that the members of present and future generations are linked to each other by bonds of a family kind that guarantee the actual transfer of goods from "parents" to their immediate descendents, i.e. their "children" (Barro, 1974). This is so whenever the welfare of the children enters positively into the utility function of the parents. A way out of this kind, however ingenious, is not a great help when it comes to the problem of sustainable development, for an obvious reason. In the long term, that is the temporal perspective needed to deal with the issue at stake, it is not very useful to restrict ourselves to considering only two consecutive generations. As Daly and Cobb wrote (1989): "Families last in time only by fusing and mixing their identities by means of sexual reproduction. They are thus not independent or clearly defined over the period of time embracing more than two generations. Your great great grandchildren will also be the great great grandchildren of fifteen other people belonging to the present generation, whose identity is unknown. Presumably, the welfare of your great great grandchildren will depend on the inheritance of each of these fifteen other individuals as much as yours. This is why it doesn't make much sense that you worry overmuch about your descendents" (p. 39).

As will be readily understood, the paradox discussed here cannot be resolved in the way Barro suggests, because it is inconceivable that the families of the present-day generation can organize among themselves an adequate transfer of resources for the welfare of their children, who will in the future set up families in their turn. The simple reason for this is that the more important transfers between the generations have to be carried through before the children have reached the stage of personal independence. It will thus be evident that it is on society as a whole that the burden falls of ensuring to future generations what is necessary to satisfy their needs. And this is also the case where living individuals show altruistic preferences towards their distant descendents. Indeed, in circumstances of this kind, the welfare of future generations would take on the features of a public good and the individual transfers, in the absence of some kind of mechanism of a collective nature, might generate suboptimal results for the future generations, or even unfair ones, as Sen (1982) has persuasively demonstrated.

Generalizing for a moment, the argument here sketched exposes a very serious aporia in economic theory, which while it busies itself *ad abundantiam* with individual behavior and its consequences, shows no interest at all in the beliefs and motivations that lie behind human action. This gap is sometimes concealed by the consideration that, since in a market economy the consumer is sovereign and hence free to express any kind of preference, including altruistic ones, there would be no reason to worry about the motivations behind his or her choices. (It should be noticed in passing that this is the commonest justification in economics of consequentialism as an ethical doctrine). That things do not stand like this is shown by the realization that caring for the needs of others (sympathy in Adam Smith's sense - the spirit of solidarity) is not an innate virtue in the human being. It is rather the result of a slow and systematic process of education. This is why for a sustainable development the argument on lifestyles that respect the creation is so centrally important, in other words the adoption by individuals of life practices that respect the environment. (4) As long as a culture founded on the models of a consumer society prevails, especially among the young, it is obvious that politics will not be able to do otherwise than respond to this kind of signal and translate it into choices that are a logical consequence of it: increasing the levels of productivity to diminish the prices of goods and services to further increase their production and consumption, etc. C.F. Weizsacher's words to the Seoul ecumenical assembly of 1990 are relevant here: "I know some politicians who want to do the really necessary things, but who know that as soon as they do something reasonable they will lose the next elections. It is for this reason that I am against the idea that politicians are mainly responsible, the most guilty of all. No, it is we [citizens] who are the guilty ones". (5)

#### 4. The history of official declarations on the subject of the environment

A proper awareness of environmental issues, at the level of institutional policies and international organizations, is quite recent. If we exclude the *Octogesima Adveniens* of Paul VI (1971), where we find the first explicit stance on the relationship between humanity and environment in an official document, the history commences in 1972 in Stockholm, where the Conference of the United Nations on the Human Environment took place. 1972 is also the year of the publication of the famous Report of the Club of Rome, redacted for the latter by the System Dynamics Group of the MIT (USA). The theory of the physical limits to economic growth finds its first rigorous formulation in this Report: natural resources are not endowed - as so many economists had thought from the end of the eighteenth century onwards - with such "original and indestructible powers" as to make them inalterable, not even in the long term, by man's economic activities. On the contrary, they constitute a finite stock, so the thesis of unlimited growth loses all scientific foundation. Hence the economic policy advice: we need to add a further constraint to economic calculus to keep in mind the exhaustion of natural resources.

Only five more years pass before the Leontief Report came out in 1977, commissioned by the UN, after the name of the Nobel prize-winner in economics who coordinated and lead the whole research. In the part of the Report specifically dedicated to the question of the environment, the expression "limits to growth" disappears. Rather the conviction is expressed that with the predisposition of adequate economic measures and well-designed incentive mechanisms, it would be possible to solve the environmental problem without imposing futile limits to the possibility of growth of the economic system.

We thus arrive at 1987, the year of the already mentioned Brundtland Report, known also as "The future of us all". Two new striking features stand out. For the first time the idea of sustainable development was introduced, even if this had previously been raised (without success) in 1980 in a declaration of the World Conservation Strategy of the International Union for the Conservation of Nature and Natural Resources. The Brundtland Report also explicitly opens up to the ethical dimension in its treatment of the issue of the environment, starting precisely from the concepts of equity (both intergenerational and intra-generational) and rights of the future generations. I note in passing that this latter principle will provoke a heated debate in the years immediately following in the field of the philosophy of right: how can the attribution of rights to people who did not yet exist (those belonging to future generations) be justified from an ethical perspective?

To complicate the picture further, in 1991 the "Declaration of Peking/Beijing" was issued, signed by the representatives of the G77 countries (to the initial 77 developing countries another thirty will be added). In this Declaration, not only the ethical dimension of environmental issues was completely ignored - in particular, no reference to the rights of future generations was made - but above all "the rights of developing countries to growth" was strenuously asserted, put forward as a priority, an objective to take precedence over the protection of the environment. Overall, the struggle to defend the environment was seen, by the more than one hundred developing countries that signed the Declaration, as a luxury for rich countries and as a tool for economic oppression.

The following year the well known Conference was held in Rio de Janeiro, organized by UNCED (United Nations Conference on Environment and Development), that ends up with the similarly well known "Agenda 21" - the first important document outlining a program of policies of protecting the environment. Three were the points that for our present purposes it is useful to point out. First, the philosophical and political position of the Brundtland Report was reaffirmed, but with a particular slant to it: the defense of the requirements of national sovereignty, also in environmental questions. Developing countries especially claimed recognition of the right to use their natural resources to accelerate growth, without any external interference. Secondly, in the final document of the Rio Conference the risk of keeping environmental and economic issues separate was expressly criticized. This was the risk of so-called "eco-imperialism": environmentalist movements and defenders of protectionist policies in OECD countries collude to limit access to western markets of products from developing countries. Third, the project of the great transnational companies to gain acceptance for the principle that market instruments and economic growth offered the most valid guarantee to ensure sustainable development failed completely. It was primarily the environmentalist groups of the North who were afraid of the so-called "pollution havens": i.e. the fear that the application of the rules of free trade sanctioned, then by GATT

and today by the WTO, could overwhelm the measures for the protection of the environment. (6)

We thus arrive at the Kyoto Summit of 1997, where, quite unexpectedly, the logic of the separation of ecological and economic questions, that had been abandoned by the Conference of Rio, was reaffirmed. To be precise, the delegates to the "Convention of the United Nations on Climatic Change" signed a Protocol committing the industrialized countries of the OECD (thirty-eight countries overall) to reduce their gas emissions affecting the greenhouse effect by 5,2%, on average, compared to the 1990 levels, over the period 2008-2012. (The commitment for the EU, the USA and Japan is 8%, 7%, and 6%, respectively). The real novelty in the Kyoto Protocol was that, while the developing countries were not held to reducing their emissions, the advanced countries, to mitigate the costs deriving from the implementation of the agreement, could utilize a certain number of flexible (market) mechanisms, in which the object of negotiations are the "emission permits": the country going over the emissions it had agreed to could buy "pollution permits" from those countries that had remained below their agreed levels. (7) The Hague Conference of November 2000, called so that the Kyoto Protocol could begin to be applied already in 2002, ended in sensational failure: the EU insisting on ratification, but the so-called "umbrella group" (USA, Canada, Japan, and Australia) rejecting ratification in the name of reasons only apparently of a technical nature. (8)

As will easily be realized from this rapid review, the short but turbulent history of official positions on environmental issues is characterized by this almost systematic alternation of quite markedly different points of view and lines of action. It is a history of steps forward and steps backwards, of often apparently unmotivated swings from radical innovation to conservative retreat, as if the terms of what was at stake were not clear to everyone. The fact is that without a holistic vision of the environmental issue, capable of making us realize that the environment is not simply a question of degradation or of exhaustion of resources, and without overcoming the limitations of a scientific research that is too "sector-oriented" and too little transdisciplinary, the "new alliance" between mankind and nature – to use the ichastic expression of I. Prigogine – will never be able to be carried through.

## 5. The struggle against poverty and sustainable development

Where do we begin if we wish to get beyond what is still the most common, i.e. dichotomous, way of facing the crucial central problem of sustainable development? I would not hesitate to indicate the reduction of the welfare gap between the North and South of the world as the *primum movens* of a strategy of this kind. Let us see if we can make this clearer.

Globalization - it is now a well-known fact - is a positive sum game, a game that increases overall wealth and income, but at the same time tends to increase the social distances between countries and inside each country, the distances between a social group and another. In other words, globalization reduces absolute poverty while spreading relative poverty. This is a paradox: something that, according to the Greek etymology of the word, marvels, surprises. While overall wealth increases and absolute poverty (the inability of a person or group of people to attain the threshold conditions of subsistence) decreases, relative poverty is on the increase. According to recent official studies, globalization has reduced absolute poverty over the past 25 years: there would have been approximately 2 billion people living in absolute poverty, whereas currently there are 1.2 billion. This is clearly still a tragic figure, but lower than it would have been without globalization. Many observers, who do not distinguish between people living in absolute poverty and relative poverty, sustain that the existence of 1.2 billion people living in absolute poverty is a result of globalization. This is not true. However, it is true that globalization increases the gaps, and that is a serious problem. According to a recent research of the World Bank, the world Gini coefficient - which is the most widely used statistical indicator to measure inequality - was 62.5 in 1988. In 1993, it went up to 65.9 and in 1999 to 69. An increase of 0.7 Gini points per year is something really extraordinary. (See Milanovic, 2000, for the details and, in particular, for the important distinction between *world* income distribution and *international* income distribution: the latter being based on differences in mean incomes - weighted by population size - between countries; the former considering also income inequality within countries).

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It has been shown that when inequalities - relative poverty - exceed a certain critical threshold in a given country or region, the conditions become ripe for the outbreak of a real, full-scale civil war. There have been 49 civil wars in the world over the last 40 years, the vast majority being triggered by ever greater inequality. Therefore, no one who values peace can remain silent in light of the increase in relative poverty. Moreover, when relative poverty increases significantly, democracy itself comes under fire. This cause/effect relationship has been demonstrated: when inequality in a country exceeds a certain level, those in a position of relative disadvantage stop participating in the democratic community life, which leads the way to the varying forms of totalitarianism, the most prevalent at present being technocratic, not military, totalitarianism. (See Uslaner, 2001, for details on the numbers, in particular about the link between inequality and democracy).

It is not true that maximum extension of the market area improves everybody's wellbeing. The aphorism according to which "a rising tide raises all boats" is not convincing. As we know, this is the most favourite metaphor with the recent liberal-individualistic formulation according to which, the wellbeing of people being a function of economic prosperity which in turn is linked to the spread of market relations, the actual priority of political action should be an effort to ensure all those conditions (fiscal, public administration, optimum allocation of property rights and so on) which foster a flourishing of markets. In that vision, the welfare state which redistributes, via taxation, wealth while keeping itself outside the wealth-producing mechanism, hampers economic growth, all the more so when it is greedy (causing major distorting effects in the market) and when its instruments are submitted to political uses, thus jeopardizing normal democratic dialectics. Hence the recommendation that the welfare system should take care solely of those whom the market contest leaves on the fringes of society. The others, those who manage to stay inside the virtuous circle of economic growth, will take care of their own protection by availing themselves of the numerous solutions offered by private insurance schemes.

Where is the weak point in such argument? It is to be found in the simple reason that the prerequisite of equal opportunities for all is one that must apply throughout the life-span of citizens and not just *una tantum*, the moment they enter the economic arena. To put it another way, for all participants to enjoy actual conditions of freedom it is not sufficient to ensure equal opportunities at the start of the economic race. The market contest is indeed quite different from a sports contest. In the latter, the most gifted or capable wins the prize but this in no way confers upon him the possibility of, or bestows upon him, the right to start the next run from a vantage point: all, with no exception, compete under the same conditions, at any stage or tier of the game. Not so in market contests, where the winner of the first stage is quite often able to bend to his advantage, in an endogenous way, the rules of the game. (Economic history is rich in examples of this kind. We need but to recollect how monopolies and oligopolies developed in the course of time). Furthermore, the really alarming news about the *new economy* age - the economy of knowledge and information - is the appearance of a new kind of competition: *positional* competition as it was called by the late Fred Hirsch. The central feature of positional competition is the generation of "winner-take-all" outcomes, the so-called "superstar effect", as the American economist Shermin Rose called it. It is easy to see that in presence of positional competition equating across individuals initial opportunities are of little or no avail. Finally, in a very recent paper, Glaeser et Al. (2002) have proposed a new mechanism by which unfair wealth distributions shape economic and social outcomes: subversion of institutions in the form of corruption, intimidation and other forms of influence. The fact is that in countries where wealth is unequitably distributed, the wealthy and the politically powerful groups of society tend to subvert the operation of legal and regulatory institutions for their own benefit.

The results are there for everybody to see: never to the same extent as in the last two decades has one witnessed such an outburst of social inequalities, both horizontal (among different social groups) and vertical ones (among one subject and another), at the same time as the world's wealth has been growing at a pace never seen before. This is the great aporia of the present model of development: extraordinary economic growth (in the sense of sustained increases of wealth) and civil progress (in the sense of wider and wider spaces of freedom for people) are unable to keep the same pace. It is therefore easy to understand why, under such circumstances, an increased affluence does not go hand in hand with a struggle for sustainable development.

As is well known, there are three main causes of environmental degradation: inefficient allocation of resources; the iniquitous distribution of these; disproportion between population and capacity of the environment to sustain it. Whereas in rich countries the first of these causes

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is operative, poor countries are mainly afflicted by the other two causes. Through their structural characteristics, these countries tend to specialize in the production and export of goods with a high intensity of environmental degradation. Even now, 2/3 of Latin America's exports are made up of natural resources – Africa's percentage is still higher – resources that are imported and consumed in the countries of the North. These data, though crude, are already sufficient to have us understand why the question of sustainable development cannot be separated from the reform of the rules of international trade. When we discover that the South exports goods of a high intensity of environmental degradation, though it is not true that the South disposes of higher quantities of these goods compared to the North, we may realize why commercial policies based on the Ricardian principle of comparative advantage are a serious threat to sustainability. If we then consider that most developing countries are located in the region known as the "vital zone", characterized by highly unstable ecological equilibria and by a marked capacity to influence the atmosphere, we realize why if we continue to force these countries to use their natural capital to substitute for an insufficient physical and human capital, environmental degradation will inevitably suffer a rapid acceleration.

But there is still more to it than this. In a document published some years back (in 1992), the World Bank thoroughly detailed the relationship existing between some indicators of environmental quality and levels of GNP per head. A relation emerged that could be shown through a curve in the form of a U turned upside down: environmental degradation grows with the increase of average income when the latter is at low levels, whereas it decreases with the increase of average income when the latter has gone above a certain threshold. Basing their work on this rich empirical material, Grossman and Krueger (1994), through econometrics, find that the level of the critical threshold of average income, beyond which the above mentioned curve begins to decrease, stands at around \$8,000 per head income a year (dollars of 1985). The curve in question is known in the literature as the "Environmental Kuznets curve", (EKC) from the name of the Nobel prize-winner for economics who first studied its characteristics with reference however to the relation between levels of GNP per-capita and variations of an indicator of the inequality of income within a specific population. The empirical evidence in support of the EKC is still today insufficiently robust to recommend its use for the purposes of environmental policies. It is nevertheless possible to extract from the EKC the following broad indications: some indicators of environmental degradation (emissions of CO<sub>2</sub>; solid urban waste) increase, i.e. get worse, with the increase of pro-capita income; others (the lack of clean water; hygiene indicators) diminish, i.e. improve, with the increase in per-capita income; still others (emissions of anhydride of sulphur and nitrates) first increase and then diminish with the increase in per-capita income. (9) What are the forces of the EKC relationship? A brief survey of recent literature will provide some useful hints.

Magnani (2000) discusses the influence of income inequality in connection with political economic reasons for the existence of EKC. She argues that income inequality in a country determines the position of the median voter demanding environmental expenditures. A high degree of income inequality leads to a median voter having only little preferences for green parties. As a consequence environmental expenditure in the considered country will be low. The author states that "the empirical results point to a positive absolute income effect and a negative impact of income inequality on environmental protection". Rothman (1998) favour a consumption based approach in connection with the so-called pollution haven hypothesis. Consumers in wealthy nations succeed more than other in distancing themselves from environmental problems by international trade. The richer a country the production of pollution intensive goods will be more and more dislocated in poor countries with lax environmental regulations. For that reason the author regards more consumption oriented environmental indicators such as CO<sub>2</sub> emissions or municipal waste. Rothman shows that for these indicators EKC's do not appear whereas production-based indicators prove the existence of EKC's. The analysis of Rothman is supported by Gawande, Bohara, Berrens and Wang (2000) who test the role of internal migration as a factor for the appearance of EKC's for US hazardous waste sites with respect to the fact that primarily rich people are able to migrate.

Another argumentation is given by Andreoni and Levinson (2000). The authors show that "an environmental Kuznets curve can be derived directly from the technological link between consumption of a desired good and abatement of its undesirable by-product". They assume that scale effects of environmental technologies play a major role in explaining EKC's. "As an economy grows, more and more industries and manufacturing facilities become large enough to make the capital investment in abatement technologies worthwhile". De Bruyn (1997) carries out a decomposition analysis to find out the relative importance of intrasectoral changes with respect to structural changes between branches. Intrasectoral changes denote

"... the combination of technological change and shifts in the product mix within sectors". For the case of sulphur dioxide with respect to Germany and the Netherlands from 1980 to 1990 de Bruyn emphasizes the role of technical progress within sectors for the appearance of EKC's whereas inter-sectoral structural change was not significant in his analysis. Suri and Chapman measure the influence of structural change between branches (variable "share of manufacturing"), trade and especially the role of imports for the downward slope of EKC's for pooled cross-section and time series data of 33 countries from 1971 to 1991. Contrary to the results of de Bruyn they found a significant influence of inter-sectoral changes on energy consumption. In an econometrical analysis Agras and Champman (1999) show a strong negative influence of energy prices for the development of CO<sub>2</sub> emissions and energy consumption. In a further empirical analysis for 23 countries Kaufmann, Davidsdottir, Granham and Pauly (1998) find out that "... spatial intensity of economic activity, rather than income, provides the impetus for policies and technologies that reduce SO<sub>2</sub> emission". Torras and Boyce (1998) analyse the importance of literacy, political rights and civil liberties as main factors of ELC. It has to be noticed that there is a lack of research concerning the role of environmental policy.

What lessons can be learned from the EKC literature? Since Northern countries are to the right of the value of the critical threshold mentioned above, whereas most Southern countries are still a long way off this goal, and since the environmental problems that worry us the most today are the global ones, it is evident we shall have to intervene urgently on the rules of international economic activities. In particular, we must realize that in the context of an increasingly globalized economy, environmental regulation and commercial regulation have to be integrated and harmonized, exactly the opposite to what has happened up until now in the WTO. (cf. Pearson, 2000)

It is well known that international trade tends to separate production from consumption. An increase in the demand for tropical wood in the North translates into a corresponding reduction in tropical forest in Amazonia. It is a fact that international trade throws a long, dark shadow over the environment. Without adequate rules and without forms of close cooperation between the agencies that concern themselves with trade and the environment, the growing volume of commercial exchanges (in itself positive and a hopeful sign for the future) will translate into increases in environmental degradation.

The second and more important message is that the problem of the sustainability of development, in present-day historical conditions, is intrinsically linked to the problem of poverty, both absolute and relative (cf. Pasca di Magliano, 2000). It would be naive to imagine we can solve the former problem separately from the second, or worse still, in opposition to it. Efforts to improve or conserve the quality of the environment in the North will be of very little use unless at the same time there is an urgent and comprehensive program of action against poverty to allow the countries of the South to get beyond the critical threshold identified by the ECK. Clearly, there will have to be a program of redistribution on a global scale, since policies on a national scale are no longer adequate for the purpose. If we stop and think for a moment, we find ourselves faced with a specific, yet remarkable case, in which the defense of justice serves also to improve efficiency (here identified with the sustainability of development) - so it is not always true that there is a trade-off between efficiency and justice!

## 6. Towards a World Organization of the Environment

S. Pastel wrote some years ago: "The world economic system seems incapable of facing up to the problem of poverty and the protection of the environment. Seeking to cure the ecological ills of the earth separately from the problems linked to situations of debt, commercial imbalances, gross inequalities in income levels and in patterns of consumption, is like trying to cure a heart disease without struggling against the obesity of the patient and his diet rich in cholesterol". (quoted in L. Brown, 1992) But to what do we ultimately impute this evident incapacity? To the fact that the nature itself of the most important environmental goods is that of global public goods. While a single global economy does not yet exist - notwithstanding the great debate on globalization - we find ourselves having to deal with a single climatic system, with a single ozone layer, etc. These are global public goods: the use of these by one country does not diminish the amount available to other countries; on the other hand, no country can be excluded from making use of them. (Clearly, the emissions of polluting substances are public global "evils").

Now, as economic theory has known for some time, public goods give rise to one irritating consequence, typical of all the situations known as "the prisoner's dilemma". And if the public good is global the awful consequences will be global. In 1990, the Intergovernmental Panel on Climate Change showed that the emissions of greenhouse gas led to an increase in average temperatures, with all the well known consequences. And yet very few countries acted, unilaterally, to reduce their emissions. Similarly, the European Union proposed the introduction of a carbon tax in Europe, but having seen that their example was not imitated by other countries (especially the USA) it changed its plans. It is precisely the two characteristics recalled above, of the public good, that makes unilateral policies wrong as a strategy of environmental politics.

Even if negotiations eventually produced some form of agreement or international treaty, the problem of how to carry it out would still have to be solved. We only have to think of the case of the Protocol of Montreal for the regulation of the use of chemical products (the CFC) that destroy the ozone layer, and the already mentioned Kyoto Protocol on climatic change. Why did the former work, producing the desired effects, whereas the latter has mainly failed, as we saw above? The answer is that the Montreal Protocol contains an incentive mechanism that encourages the active participation and adherence of all the countries that signed it, a mechanism that means it is in the interest of all countries to keep to the rules agreed upon. The designers of the Kyoto Protocol were incapable of finding the right mechanism to ensure its self-enforcement. (cf. Barrett, 2001)

As G. Kirchgassner and F. Schneider show ("On the political economy of environmental policy", CESifo W.P., 2002), the application of market based instruments is neither in the interest of the public bureaucrats nor of the industries to be regulated. If any instrument of environmental policy is used at all, both groups of actors have much stronger interests in applying traditional bureaucratic measures. Which explains the situation of to-day's environmental policy. It is certainly true that on the international level, there seems to be an increasing willingness to apply market based instruments. For example, there has been an increasing number of countries in Europe which use environmental taxes, especially energy taxes. Again, in the Kyoto process, internationally tradable permits were intended to play a major role in international environmental policy, together with other (but related) market based instruments like "joint implementation" and "clean development mechanism" projects. However, we are still away from general acceptance and widespread application of market based instruments.

What type of institutional change would increase the use of incentive orientated environmental instruments? According to the authors quoted above, three suggestions can be put forward. First, decentralized policy using the principle of subsidiarity, according to which, each environmental task should be fulfilled by the smallest most decentralized unit. Second, the use of direct voting and referenda. Voters can act as agenda setters and make decisions about the use of incentive orientated ecological instruments which are not attractive for governments, because this use is opposed by pressure groups. This implies that market instruments have better chances to be implemented in a direct democracy. Third, compensation by general tax reductions. Market instruments can be improved by compensating the additional burden of ecological taxes and tradable permits through general tax reductions. Hence, the size of the public sector is not increased and voters' resistance against ecological policies could be reduced.

Where do the reflections above lead? They suggest the urgent need to set up a World Environment Organization (WEO) along the lines of what happened some years ago, with the setting up of the World Trade Organization (WTO). It is the lack of institutions (not bureaucracies!) at the global level that makes so many problems of our age hard to solve, especially the environmental problem. While markets get globalized, the transnational institutional landscape is still that of the immediate post-war world. But the Bretton Woods negotiators of 1944 could not even have imagined what the environmental issue would have become. It will be objected: aren't there perhaps enough international treaties, just as there are enough contracts at the domestic level to regulate relationships between individuals? The analogy is dangerously misleading, because contracts stipulated inside a country can be enforced by that country's State; but there is no transnational authority capable of enforcing treaties between states. This is why an WEO is needed. On the whole, it is hard to see how the present state of affairs can continue, while the market, in its great variety of forms, has by now become global, the governance set-up has stayed basically national or at the most international.

The two tasks this organization should give priority to are as follows. First interacting with the WTO, such an agency must seek to make the rules of free trade compatible with those set out for the protection of the environment, and it must also get them respected by all concerned. Secondly, WEO must intervene, in a supplementary role, in all those increasingly frequent cases in which price signals are unable to anticipate irreversible environmental loss. As we know, it is by now proved that thresholds of environmental degradation exist, that to a certain extent economic activities do not block the regenerative functions of the environment, but beyond that point irreversible changes can take place due to the level of economic activity overwhelming the eco-system's capacity to assimilate it. In situations of this kind, the market mechanisms get jammed: hence the need for their support through the intervention of an *ad hoc* agency. Let me elaborate a bit on this point.

The key to understanding globalization, I believe, is to clearly distinguish it from internationalization. Internationalization refers to the increasing importance of relations between nations: international trade, international treaties, alliances, protocols, etc. The basic unit of community and policy remains the nation, even as relations among nations, and among individuals in different nations, become increasingly necessary and important. Globalization refers to global economic integration of many formerly national economies into one global economy, by free trade, especially by free capital mobility, and also, as a distant but increasingly important third, by easy or uncontrolled migration. Globalization is the effective erasure of national boundaries for economic purposes. National boundaries become totally porous with respect to goods and capital, and increasingly porous with respect to people, viewed in this context as cheap labour, or in some cases cheap human capital. In sum, globalization is the economic integration of the globe.

But exactly what is "integration"? The word derives from "integer", meaning one, complete, or whole. Integration means much more than "interdependence" - it is the act of combining separate albeit related units into a single whole. Interdependence is to integration as friendship is to marriage. Since there can be only one whole, only one unity with reference to which parts are integrated, it follows that global economic integration logically implies national economic disintegration - parts are torn out of their national context (disintegrated), in order to be re-integrated into the new whole, the globalized economy. All that I have just said was expressed with admirable clarity, honesty, and brevity by Renato Ruggiero, former director-general of WTO: "We are no longer writing the rules of interaction among separate national economies. We are writing the constitution of a single global economy". This is a clear affirmation of globalization and rejection of internationalization as just defined. It is also a radical subversion of the Bretton Woods Charter. Internationalization is what the Bretton Woods Institutions were designed for, not globalization.

After the April disruption of its meetings in Washington DC, the World Bank sponsored an internet discussion on globalization. The closest they came to offering a definition of the subject under discussion was the following: "the most common core sense of economic globalization... surely refers to the observation that in recent years a quickly rising share of economic activity in the world seems to be taking place between people who live in different countries (rather than in the same country)". Mr. Wolfensohn, president of the World Bank, told the audience at the Aspen Institute's Conference, that "Globalization is a practical methodology for empowering the poor to improve their lives". That is a wish, not a definition. It also flies in the face of the real consequences of global economic integration. The World Bank's definition conflates globalization and internationalization as defined above. Consequently, much of the long internet discussion was beside the point. If the IMF-WB-WTO are no longer serving the interests of their member nations as per their charted, then whose interests are they serving? The interests of the integrated "global economy" we are told. But what concrete reality lies behind that grand abstraction? At this point, one can perceive the rationale for the creation of a WEO.

## 7. In lieu of a conclusion

The question spontaneously arises: given the problems and the difficulties to solve them, should we perhaps resign ourselves and let the processes occurring today go ahead according to their own internal logic? To think like this would be overwhelmingly irresponsible, because in actual fact there is no need, as some people suggest, to halt the process of growth or that of globalization. What is really needed, and urgently, is to work

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for the establishment of an economic and social order founded on the plurality of power centers, i.e. on a polyarchy, which unlike pluralism, is not just a question of numerousness, but above all diversity: both of the modes of production and models of consumption.

It should not be forgotten that our well-being depends also on the institutions we manage to endow ourselves with, and not only on our capacity to adapt to an institutional set-up we have inherited from a more or less remote past. In this sense, economics must take part of the responsibility for having fostered certain perverse effects of the market mechanism, effects that in their turn have ended up by legitimating - even in recent times - certain forms of neo-colonialism and certain practices of exploitation. However paradoxical this may appear, this began to happen precisely when economics was defining itself as a science free from value orientations, as a science that, in order to assume the epistemological status of the natural sciences, especially physics, had had to declare the world of life outside of its realms of knowledge. Yet we need to avoid a new mistake being made today. That economic research ends up by destroying, especially among the younger generation, all hope in a change of intellectual regime, a change that places the human being, the person, at the center of attention.

The difficulties and risks inherent in the practical carrying-out of a strategy of this kind are obvious to everyone. It would be ingenuous to think that the diversity of the interests involved do not mean high levels of conflict. But the task is unavoidable if we wish to overcome the affliction of a rhetoric at all costs (a rhetoric that often ends up by appearing nihilistic), as well as a clear-eyed optimism of those who see in technical, scientific and economic progress a sort of triumphal march of humanity towards its fulfillment. The responsible person cannot fall victim of traps of this kind. As Dante Alighieri had understood so well when he closed the eighth canto of the Paradiso as follows: "*Sempre natura, se fortuna trova / discorda a sè, come ogni altra semente / fuor di sua region, fa mala prova. / E, se il mondo laggiù ponesse mente / al fondamento che natura pone, / seguendo lui, avria buona la gente* [Always, if nature meets with fortune unsuited to it, like any kind of seed out of its own region, it has ill success. And if the world below gave its mind to the foundation that nature lays and followed it, it would be well for its people]". (139-144).

#### NOTES

- 1) For an historical excursus into ethical thinking on environmental matters, and for a convincing defense of the thesis that the environment has to be included in the realm of ethics as such and not just insofar as it is a system of resources for humanity, see C. Vigna (2001).
- 2) See A. Stres, 2000, for an excellent treatment of the specifically cultural roots of environmental questions.
- 3) An important line of philosophical and theological thinking on the subjects discussed here is K. Golser, 2001. Referring to St. Bonaventura, Golser argues that the realities of creation were in the first place created for the glory of God and only secondly for humanity's benefit. Thus before being useful, they are good.
- 4) See A. Giordano's provocative text, "La spiritualità e gli stili di vita sostenibili", mimeo, May 2001. The treatment of this subject in Keenan, 2000 is quite effective.
- 5) Quoted in One World (Monthly Magazine of the World Council of Churches), 155, May 1990, p.16.
- 6) For further detailed analysis see A. Vallega, 1994.
- 7) Obviously there is much else that is new in the Kyoto Protocol, and the consequences of its eventual implementation have yet to be analyzed. To give just one example, there is the problem of the compatibility of environmental and commercial policies, and policies of international investment. For useful treatment of this, see UNU, 1999.
- 8) It should be recalled that from December 1997 to the end of 2001, just over 30 Countries have ratified the Protocol, though more than 55 are needed for it to become effective. Of the countries that have ratified it, not one belongs to the so-called Annex I (i.e. the 38 more advanced countries, including those of Western Europe). See Victor (2001) and Carraro (2001). Only in late 2002, after the announcement of ratification by the part of China and Russia

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at the Johannesburg Conference, the implementation of the Kyoto Protocol has become effective.

- 9) A useful critical review of the more recent literature on the subject is in S. Borghesi, 1999.

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