Distributional Obstacles to International Environmental Policy: The Failures at Rio and Prospects after Rio[1]

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ABSTRACT: The concept of 'sustainable development' as used by the Brundtland Commission was meant to separate environmental policy from distributional conflicts. Increases in income sometimes are beneficial for the environment (for instance, they allow the use of domestic cooking fuels which in some ways are less damaging to the environment), but higher incomes have meant higher emissions of greenhouse gases, and higher rates of genetic erosion. In the aftermath of the Rio conference of June 1992, this article analyses some unavoidable links between distributional conflicts and environmental policy.

Often, environmental movements have tried to keep environmental resources and services outside the market, but there are now attempts to establish property rights on, and to give money values to environmental resources and services, such as agricultural genetic resources and the CO_2 absorption facility provided by the oceans and new vegetation. European 'green' proposals to impose an 'eco-tax', and proposals from India to create a world market for CO_2 emission permits are considered. The issue raised by the growing Third World agroecology movement, of payment of 'farmers' rights' for *in situ* agricultural biodiversity is discussed. The article includes a short discussion of the North American free trade agreement (NAFTA) between Mexico and the USA, in so far as it involves so-called 'ecological dumping', i.e. trading at values which do not include environmental costs. In the last sections, the article asks how prices in ecologically-extended markets would be formed, how much such prices will depend on distribution, and how much (or how little) such payments would change distribution of income. Environmental movements of the Poor are faced with the dilemma of keeping environmental resources and services out of the market, or else asking for property rights to be placed on them.

KEYWORDS: property rights, environmental movements, greenhouse effect, agricultural biodiversity, environmental policy, poverty and environment, ecological debt

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INTRODUCTION

The UNCED in Rio in June 1992 failed to reach effective agreements on climatic change and on the conservation of biodiversity. This is the starting point for this paper, which has grown out of my research interests on Distributional Conflicts and Environmental Policy, and on the Environmentalism of the Poor.[2]

The main objectives in Rio were to reverse the trend towards increased emissions of CO_2 and other greenhouse gases, and to stop the increase in genetic erosion. Such historical changes would affect the geography of emissions and the geography of biodiversity, and would have different distributional impacts for different countries and their citizens. In Rio a convention was signed on global warming, but without firm commitments. The USA government (and therefore, under its authority, the major seed and biotechnology firms) failed to sign the biodiversity agreement. The present USA administration will probably sign the biodiversity agreement, but this agreement makes no provision for payments for the genetic materials preserved *ex situ*, nor does it contain safeguards for the conservation of *in situ* agricultural biodiversity through concrete measures of support for agroecology. Thus, the official UNCED at Rio failed on the issue of the greenhouse effect, and also on agricultural biodiversity. It produced a lot of wet paper, hopefully recyclable at a later date, but without effective results at present. The lack of success is due to distributional conflicts which became a hindrance for environmental policies geared to an ecological economy.[3]

It has been said that the regulation of external environmental effects has strong intra- and intergenerational distributional impacts, since it implies the expropriation of environmental property rights which used to belong (in practice) to the polluting agents.[4] Conversely, inequalities in income distribution have an influence on the values placed both on environmental resources (e.g. genetic resources which up to now were considered the 'patrimony of humankind', even at this dawn of the biotechnological age) and on environmental functions (e.g. CO_2 absorption by oceans and new vegetation). Thus in Rio, the Rich[5] saw the CO_2 absorption facility provided by the oceans and new vegetation as basically a free access good available on a first come, first served basis. Some well-informed and intelligent voices from the Poor[6] argued for ownership rights to this CO_2 sink function to be instituted, and to be shared equally by all of humankind, in such a way that poor people making little use of it (because of their low CO_2 emissions) could sell their unused part to the Rich. Naturally, additional questions arise. Would such quotas be available if the poor become richer? What would be their price? Which authorities would collect the receipts, and to which ends would they be applied?

Genetic resources for agriculture have been developed in many different places in the world over the last few thousand years, by traditional methods of plant breeding, mostly outside the market. The ownership rights to, and the

values placed on such environmental resources are now a subject of political contention. Similarly, the ownership rights to, and the values placed upon the environmental sink function for CO_2 emissions, have become hotly contested. Behind such disputes there are distributional conflicts. Different outcomes will imply different environmental policies. Of course, such policies will also be influenced by today's views on uncertain, future changes in technology but the assessment of technological change is itself also subject to political dispute.

SOCIAL RESPONSES TO EXTERNALITIES

This paper is concerned with the valuation of environmental resources and services, and my main focus will be on the increased greenhouse effect and biodiversity, particularly CO_2 emissions and agricultural biodiversity. The paper is also concerned with the role of environmental movements in the North and in the South, and their practical influence on environmental policies. Environmental movements sometimes use conventional scientific language, as for instance the anti-nuclear movement in Europe or the USA since the 1970s if not before. Sometimes they use local languages (as in Chipko), distinct from the language of conventional science. Some environmental movements deal only with local issues, and take pride in this, while some (such as Greenpeace) deal also with global environmental problems.

Elsewhere I have expressed the view[7] that environmental movements are social responses against actual or threatened externalities. They grow out of conflicts between the economy and people's livelihood. They perform a function at which the market fails, that is, the complaints and actions of environmental movements raise the costs that firms (or governments) have to pay for their use of resources or for polluting the environment. The word 'externalities' refers here to environmental impacts whose values are not captured by market prices; they remain external to the market. Therefore, it would be an anachronism to call 'externalities' the effects of the arrival of smallpox, measles, pigs and sheep and other European living matter in America in 1492 or shortly afterwards. Although there were indigenous protests against such irruptions, they could not be called 'social responses to externalities' since free markets were not the dominant institution for the exploitation of American resources and labour until much later. In other words, the extraction of natural resources and the insertion of polluting or unhealthy substances (such as mercury from Huancavelica for silver amalgamation in Potosí) sometimes made the affected people complain, but 'externalities' is the appropriate word only in a generalized market system. That some effects are external to the market may be noticed only after the market extends *almost* everywhere. Then we wonder about the consequences of such market valuation failures for the allocation of environmental resources and functions, and we also ask how income distribution will change once such

environmental resources and functions are 'properly' valued. Environmental and Resource Economics is relevant for a short, recent period of human history, while Human Ecology, or Ecological Economics, is relevant for the whole span of human history including this last period. It surely would have been an anachronism to call for a 'polluter pays policy' in Huancavelica. *Mita* workers had no 'stakeholder' status, and markets for pollution permits, or Pigouvian taxes, had not been invented. In other words, exploitation is older than the generalized market system, and the interesting question is whether such *Raubwirtschaft* works now mainly through the market system, and whether it would continue to work even through an ecologically-extended market which gave chrematistic significance and valuation to externalities.

There are many local movements against externalities. For instance, one could easily do a comparative study of complaints against sulphur dioxide, from Rio Tinto in 1888 to La Oroya in Peru eighty years ago, to Puracé in the Cauca Valley of Colombia and Ilo in Southern Peru in recent times.[8] If environmental movements are social responses to externalities, are there movements against the increased greenhouse effect at world or regional level? Yes, although not exactly mass movements: for instance, the proposals by the Greens in the European Parliament (and before this, in several northern European states) for a carbon-and-energy tax, and also some proposals from India (by Agarwal and Narain) on equal rights to the Earth's 'cleaning facilities' for CO_2. Ecological movements are characteristically small-scale, and this has been preached as a virtue: Think globally, act locally. But global warming requires global action, and it is difficult to articulate a response based on local-action groups. There has been no specific Latin American answer to global warming, either at official or NGO levels.

We may also ask, are there eco-social movements against genetic erosion, in favour of agricultural biodiversity? Beyond the work of ethnobotanists and the agronomic institutions (belonging or not to the Consultative Group of the Institutes of Agronomic Research, CGIAR), there is now a growing agro-ecological movement (for instance CLADES, a Latin America consortium for agroecology), including perhaps some peasant organizations in low-income countries, preaching conservation and further co-evolution of agricultural biodiversity *in situ*. They ask for the payment of Farmers' Rights (*not* patents, *not* Intellectual Property Rights) as an incentive and reward for the preservation of agricultural biodiversity, which will compensate traditional farmers for the fact that the introduction of commercial varieties and modern farming practices is often chrematistically more remunerative. Questions arise of what will be the price of such Farmers' Rights, and who will collect the receipts.

DISTRIBUTIONAL CONFLICTS AS CONFLICTS OVER VALUATION

Before economic values are given to environmental resources or services, a necessary condition is the social perception that they exist. This is the present stage as regards the CO_2 sink function and genetic resources. The values attributed to such resources and services will depend on the different outcomes that conflicts over income distribution might have. And the reverse also applies: if certain environmental resources (agricultural genetic resources) or services (the CO_2 sink function) are considered economically valueless, this will imply a different income distribution than if such resources and services had well defined ownership rights and were transacted in ecologically-extended markets.

The market is a wonderful, non-bureaucratic institution where deals are made between individuals, but it is difficult to reach a rational consensus on the economic values of concrete externalities which the market fails to value. Usually, economic values are arrived at by market bargaining, but reliance on contemporary individual preferences evades the issue of giving present values to future, uncertain contingencies. There is a double uncertainty: about facts (e.g. how much CO_2 is absorbed by the oceans) and about the adequacy of our representations of environmental reality (whether formally scientific or not). We enter the realms of 'post-normal science' and 'political epistemology'[9] where, because of the nature of the issues, the experts are necessarily subject to an 'extended peer review', and where 'communication wars' try to influence public opinion. Another cause for disagreements on valuation is that political views, which are partly idiosyncratic, do broadly correlate with different positions or stations in life. This could be taken to be a statement about class politics or simply mean that a large part of politics is interest politics, 'stakeholder' politics. Whether one simply observes the prevalence of NIMBY happenings[10] or whether one ponderously discerns a growing social wave of 'ecological neo-narodnism' in which, with some delay, traditional agroecological farming produces a wave of ecological activism, the sociological fact is that political attitudes have often social roots, although anyone in particular might be free to choose his or her politics.

What are the use and option values, today, of keeping *in situ* the gene pool of a particular variety of maize or potatoes? Do such varieties have existence value? What is the probability that varieties in storage in 'banks' of genetic resources will lose their germinative power in a given number of years, or will disappear through social unrest (as one hopes will not be the fate of the Centro Internacional de la Papa in Peru)? Will varieties conserved *in situ* by traditional, 'clean', low-input agroecological farming be made irrelevant by gene storage and by the development of genetic engineering, or will such 'folkseeds' remain a valuable resource, especially taking into account their potential for co-evolution? There is no market valuation of such uncertain, future facts. If decisions are taken based on other judgements, outside the market, they will be

subject to individual disagreements and to political disputes.

In the following sections, I shall consider the argument that environmental resources (genetic resources) and services (the CO_2 sink function) should become marketable commodities, acquiring suitable chrematistic values so that ecologically-extended markets become instruments of environmental policies. I shall not dwell upon the inability of future generations to come to today's actual or surrogate markets, even though this is a crucial fact. I shall rather focus on the fact that market valuations depend partly on the distribution of income at present, and therefore environmental policies based on markets will not be the same if the distribution of income changes. The chrematistic valuation of environmental resources and services 'owned' by the Poor in ecologically-extended markets will change income distribution, and it is therefore opposed by the Rich, but, *if the Poor sell cheap*, then there is no reason to expect that such valuation will be an effective instrument of environmental policy. Thus we cannot simply rely on ecologically-extended markets. Environmental policies are needed which are based on social movements, beyond the operation of an ecologically-extended market where such Environment as belongs to the Poor, will be sold cheap.

A EUROPEAN 'ECO-TAX'?

The reconvened Brundtland Commission met in London a couple of months before the Rio de Janeiro conference, and courageously called for a concrete timetable of concrete reductions of greenhouse gases, but Gro Harlem Brundtland herself was at the official Rio conference as one of the main actors in this great act of procrastination. The agreement in Rio is so feeble in content that, for instance, it was signed quite legally by the Spanish government, despite the fact that this government publicly announced in Madrid and in Rio that the Spanish emissions of CO_2 (which per person are above the world average, and much above the world median) would *increase* substantially. The figure in the official Spanish report for UNCED was a 25% increase in CO_2 emissions from electricity generation in the next ten years. Inside the EEC, Spain opposed the proposal by the Environmental Commissioner, Ripa di Meana, to impose a carbon-and-energy tax of about US $10 per barrel of oil equivalent energy (which would include nuclear energy but would exclude renewable energies).[11] The European Greens had *first* proposed an 'eco-tax' of US $20 per barrel of oil equivalent energy.[12] Because of distributional conflicts, the EEC could not agree to take to Rio a unilateral decision on a carbon-and-energy tax, Ripa di Meana was so irritated that he refused to attend the Rio conference, and he later became the Italian Minister for the Environment. His idea was to present the US and Japan with the *fait accompli* of a European decision, which would challenge them to follow suit.

A carbon-and-energy tax does *not* mean that we know how to correct the

market value in order to have an ecologically-correct present-day value which internalizes the relevant future, uncertain externalities. A tax is merely a technical instrument (on a level with a system of legal standards and fines, or with a system of tradable emission permits) in order to reach a reduction in emissions. This reduction objective must be determined outside economics, through a scientific-political debate conducted in a terrain of factual and scientific uncertainties and stakeholder politics. So, the question is not the internalization of externalities into the price system (which is an impossible task, when we deal with future, uncertain events), and then business as usual setting priorities by the market. The question is rather to set ecological limits to the economy (through an open, democratic scientific and political debate), and then to force the economy to remain under such limits by a mixture of policy measures, not excluding market oriented measures.

In some cases, a cultural change in consumers' awareness (as in the case of tobacco consumption) is an alternative route to environmental objectives more effective than fiscal or other market oriented measures. This is relevant for the demand for 'organic' agricultural products, also for the demand for alternatives to the private car, which are very much under discussion here. Changes in tobacco consumption (or the conspicuous rejection of private cars in the West by ecological groups with names such as Friends of the Bicycle) are not so trivial as they might appear to economists who blandly describe them as shifts in demand curves. Such changes in needs mean that, instead of conforming with society's rules, a growing minority of people change towards a self-determined structure of needs. It must be remembered that humans have genetic instructions only regarding the endosomatic consumption of energy and materials. Exosomatic consumption which is extremely variable, depends on economic, social and cultural differences.

Let us go back, however, to fiscal measures against CO_2. Naturally, a carbon-and-energy tax on oil, or gas or coal, collected in importing countries, on top of existing taxes, irritates the exporting countries. Demand for fossil fuels would go down (this is the reason for the tax, in order to curb CO_2 emissions), and export prices would not increase, rather the contrary because of the diminished demand. For oil exporting countries, many of which (Mexico, Russia, Nigeria, Algeria, Indonesia, Iran, Iraq, Ecuador, Venezuela) are poorer than the USA, the EEC and Japan, the proper place to collect the tax would be at the point of extraction. This is why in Rio there was strong opposition to the greenhouse treaty by some governments of oil exporting countries. Would the receipts from eco-taxes be used in order to lower other forms of fiscal pressure on the Rich, or for development in the Poor countries? Could eco-taxes be collected by the United Nations? Such thoughts apply, for instance, to the huge cheap gas exports from Algeria to Southern Europe. In fact, the eco-tax could become a signal for OPEC to try and rise the price of oil, but many OPEC countries (or other oil-exporting countries such as Mexico, outside OPEC) doubt that they will have enough

oligopolic power to do so. In the case of tropical timber, there have been proposals to impose an import levy which would be repatriated to tropical timber exporting countries, via an environmental fund.[13]

FREE TRADE AND ENVIRONMENTAL COSTS: SOME THOUGHTS ON 'NAFTA'

In the USA oil prices are relatively cheap, though the USA has become a great oil importing country. A small energy tax has been introduced by the Clinton administration, and further increases in this tax backed with environmental arguments are still in the political agenda. From a Mexican point of view, the situation is paradoxical. Mexico exports cheap oil to the USA It is 'cheap' in the sense that it includes no allowance for environmental costs at the extraction zones of Campeche and Tabasco, nor for the environmental costs of CO_2 (and NO_x...) emissions, and moreover the price implicitly discounts heavily the value of future demand for oil in Mexico. Now, oil might be ecologically taxed in the US rather than in Mexico! This will certainly produce distributional fights. As things stand now, Mexico will probably be prevented by NAFTA from taxing exports, it will export cheap oil to the USA, and in return it will take goods such as maize, produced in part with cheap Mexican oil. This USA maize has very little genetic merit (since it is hybrid), and in part relies on the flow of unpaid Mexican genetic resources. USA maize exports are and will be subsidized at least in the sense that their prices include no allowance for ecological costs. Such exports will undermine Mexican peasant maize production, which is more efficient in terms of use of energy from fossil fuels and it is biologically more interesting. In other words, USA agriculture works with lax environmental norms compared to Mexican peasant agriculture.

What will be the environmental costs of the likely boom of several sectors of the Mexican economy under NAFTA? A misguided environmental lobby in the USA has focused exclusive attention on the potential effects of NAFTA in increasing production in the *maquiladora* industry across the border, and in other industries, including commercial fruit-and-vegetable growing, which work with less stringent environmental standards in Mexico than in the USA This is an important issue. Exports of domestic and industrial waste from the USA to Mexico are another important issue. But there are *also* the environmental costs of cheap oil exports from Mexico to be considered and the threat to its agroecological farming system, and food security. Such issues have gone almost unnoticed in the environmental debate about NAFTA.

The conclusion of the NAFTA negotiation in August 1992, with ratification still pending, was greeted with pleasure by USA maize (and hog) growers, who foresee an increase of exports to Mexico. The description of the situation by the press[14] still ignored the ecological critique against modern agriculture. Thus, it

was correctly argued that Mexican barriers to maize imports have prevented USA farmers from dominating Mexican food markets and from perhaps ruining hundreds of thousands of peasant maize farmers in Southern Mexico. Under NAFTA, Mexico will immediately allow the duty free import of 2.5 million tons of corn a year. The tariff against imports above this very high quantity will be phased out over fifteen years. It was further argued that this free trade policy would benefit both countries, since USA maize growing is more efficient than Mexico's, but in fact we do not really know which system is more efficient until there is an agreement on how to correct the measure of agricultural productivity by a factor that takes into account the use of fossil fuels and the loss of biodiversity in modern agriculture. Agricultural exports from the USA (incidentally, also from Europe) profit not only from direct but also from indirect subsidies, since the costs of environmental degradation are not part of the prices of such agricultural exports. They are a case, if one wishes, of 'ecological dumping'. Probably, the best agricultural production system would combine the ecological advantages of traditional Mexican farming (which is excessively based on hard human labour) and USA farming (which does not count the negative externalities it produces). The ecological critique of conventional agricultural economics leaves much room for different political views to be expressed on this issue, because the ecological critique says that the prices are wrong, but it is not able to say what are the prices which internalize the externalities.

A unifying theme for the opposition to NAFTA should be how market prices for Mexican oil exports and for USA maize exports do not include environmental costs. This does not mean that we have devised some magic method in order to ascertain the 'full environmental costs' of economic activities with future and uncertain ecological consequences. There are no 'ecologically correct' prices, in the sense that they convincingly internalize all the externalities, there are only 'ecologically-*corrected*' prices, which make a provision for environmental externalities. 'Adequate' carbon-and-energy taxes on oil collected in Mexico, and 'anti-depredatory-agriculture' taxes collected in the US, would then allow free trade flows based on ecologically-corrected absolute or comparative advantages. This is, however, not on the political agenda in the USA because of the distributional impacts it would have. It could still become part of the political agenda in Mexico, where there are somewhat faded traditions of political agrarianism (going back to Zapata) and of oil nationalism (going back to the Cárdenas of the 1930s), which could link up with the new ecological awareness.

TRADE, ENVIRONMENT AND THE GATT

There is a growing debate about Trade and Environment, of which NAFTA offers only one particular case study. In general, GATT has wrongly argued that free trade is good for the environment, because trade promotes economic growth, and growth provides resources to 'clean' up the environment. Although there are examples of a positive correlation between economic growth and a better environment (for instance, reduction of SO_2), the argument is clearly spurious if we think of domestic and industrial waste, nuclear power, and CO_2 emissions. The increasing liberalization of trade, if it promotes growth, is for this very reason damaging to the environment. Leaving the growth argument aside, there are two main points against increased trade from the environmental point of view.[15] First, the ecological cost of transport (witness the reaction in Austria and Switzerland against the externalities of increased EC traffic). Second, 'ecological dumping', i.e. the fact that trade often takes place at prices which do not make any allowance for ecological costs. Certainly, it is difficult to express ecological costs in money terms (how to value now the negative impact of plutonium in 24000 years?), but nevertheless ecological costs exist. There is nowadays a rhetorical demand for 'full cost pricing of environmental assets' and 'internalization of external costs', coming from some new quarters (the Business Council for Sustainable Development, for instance, which represents multinational corporations), and it might also come from GATT (or the new Multilateral Trade Organization) in the near future. First, you 'solve' the environmental issues, then you allow free trade to exert its beneficial influence. However, the internalization of future and uncertain externalities into the price system is not a mere economic technicality, but an open political issue. Here are some examples of trade at ecologically-incorrect prices, beyond the NAFTA case:

- Agricultural exports from the USA and the EC are directly subsidized but also indirectly subsidized since their prices do not include costs of lost agricultural biodiversity, high energy input, pollution, soil erosion.
- Electricity exports from France (liberalized inside the EC) do not include the present and future costs of the nuclear industry.
- Gas exports to the EC from Russia and Algeria do not include in their prices the costs of CO_2 (also of NOx) emissions, and future demand is heavily discounted in their price.

Historically, discussions on Unequal Exchange have focused on two issues: the underpaid labour of the poor (and therefore cheap exports from poor countries), and the worsening of the terms of trade for primary products. We should now add a notion of Ecologically Unequal Exchange (which should be carefully defined), from which an Ecological Debt has arisen which is increasingly claimed by the Poor.

EQUAL RIGHTS TO THE EARTH'S CO_2 'CLEANING' FACILITIES?

In Western Europe and in the USA the 'eco-tax' is the main instrument of environmental policy under discussion against the increased greenhouse effect. In India, a complementary proposal for an international market in tradable permits for CO_2 emissions was made in a deservedly famous pamphlet from the Centre for Science and Environment in Delhi entitled *Global Warming: a case of environmental colonialism*. The objective would be to lower worldwide CO_2 emissions so that they do not exceed absorption by the oceans and new vegetation. This sink function is at present insufficient to capture excessive emissions of CO_2. The distribution of CO_2 emissions per person is very unequal inside and across countries, both historically and at present. Against a policy of proportional reductions for every country proposed by the World Resources Institute of Washington DC (not to be confused with Lester Brown's Worldwatch Institute!), Agarwal and Narain argued (for the first time in the long social history of the greenhouse effect) that the capacity of the oceans and of the new vegetation as a sink for CO_2 should be shared equally among all persons. Thus, human respiration does not nourish the increase in the greenhouse effect (although it produces CO_2) and burning a little charcoal for cooking makes a very different contribution from driving a car regularly. Agarwal and Narain proposed that people with low emissions should not be subject to any reduction while reductions more than proportional would be demanded from those with high emissions. Furthermore, countries (or regions) with emissions lower than their share of the Earth's 'cleaning' facilities (shares being determined according to population) could sell their unused quota to other countries (or regions).[16]

Large countries like China or India do appear in the statistical tables of CO_2 emissions *per country* near the top, but the USSR has disappeared from the table because it is now dismembered into its constituent nations. What matters then is emissions *per person*, although international agreements must apparently still be made between states. On a different tack, it could be argued that Agarwal's and Narain's proposal does not impose a penalty on population growth, rather the reverse. This is true. In order to counteract this effect, CO_2 emission quotas could be pegged to today's population. Historically, the remarkable demographic fact of the last 500 years in a continental comparative perspective is the expansion of the European populations, in Europe and overseas, particularly in the Americas because of the demographic collapse of native Americans after 1492, but if we take a shorter timespan, then non-European populations are growing more quickly. Which base line to take for comparisons of population growth becomes therefore another topic of political contention.

Bringing history into the greenhouse dispute has other consequences. The increase of the greenhouse effect because of CO_2 emissions was already discussed one hundred years ago by Svante Arrhenius, and it was judged to be positive.[17] 'Socially constructed ignorance' is not an excuse for the rich countries

which have belched out so much CO_2 from fossil fuels; they should be held accountable. From the Poor's point of view, there is an Ecological Debt from the Rich to the Poor.

Agarwal's and Narain's position, which became widely known in the world though it was absent from the official proposals in Rio, touched on some raw nerves. Nevertheless, the impact in terms of income distribution of their proposal remains unclear. If CO_2 emissions per person in the world were lowered to the Indian standard, then the CO_2 sink function provided by the Earth's oceans and new vegetation would have some spare capacity. If, less stringently, CO_2 emissions per person were brought down to the aggregate level that equals that sink function, then most members of the human race would be still under their allowance; they could either reserve it for later use by themselves, or, if equal rights are instituted, they could trade such quotas. One may fear that, given the poverty of India and countries in a similar position, the supply price of such quotas would be cheap unless they would manage to establish an oligopoly. It could be assumed that reduction of CO_2 is costly for the Rich (in terms of the cost of achieving increased efficiency of energy use and/or reduction of output), and therefore the demand for such quotas would be high. However, if the Poor compete among themselves to sell quotas and the supply price is low, then the Rich, even if they are very keen on buying such quotas, could profit by making agreements among themselves, and paying little and enjoying a large 'consumers' surplus'. If quotas were auctioned off, perhaps the demand price would be high, but the supply price being low, this would allow the difference to be appropriated by intermediaries belonging to the Rich portion of humankind.

FUELWOOD OR FOSSIL FUELS FOR DOMESTIC COOKING?

There is a universal, 'natural' hierarchy of domestic fuels. As incomes have risen, there is a change from firewood and charcoal to coal, to kerosene and liquid petroleum gas (distributed in bottles), and then to piped gas or electricity. Pricing policies can either speed up or reverse such changes. Availability of LPG and kerosene will depend in rural areas on the quality of roads, and will also depend on whether the country has an oil refinery. All in all, one cannot but agree that 'appropriate pricing and distribution policies for kerosene (and LPG) may be the single most important measure if the needs of both the poor and the environment are to be addressed'.[18] However, instead of concluding, with the World Bank, that subsidies to oil products for domestic cooking should be abolished, it is argued here that they should be maintained, indeed increased. There is the argument that social forestry linked to improved methods for charcoal production is a necessary contribution to a reduction of consumption of oil products; moreover forests capture CO_2 (while they are growing). But computation of the burden on the world oil market by substituting oil for fuelwood[19] shows that it

could be accommodated, since it is of the order of 100 million tons (about one third of USA oil imports). The amount of oil needed is far less than the energy equivalent to the fuelwood substituted for, because stoves which use oil or gas products are much more efficient. Kerosene or LPG stoves (as distinct from cars) could and should probably become universal mass-consumption goods, without threatening sustainability, rather the contrary.

Poor people are sometimes so poor that they cannot afford kerosene or LPG for cooking, they must cook with 'free access goods' (fuelwood, dung) or cheap goods (charcoal), without regard for the environmental consequences. As things stand now, the Poor are expected to further contribute to the achievement of an ecological economy by reducing (or foregoing an increase in) the use of scarce and polluting resources, at the same time increasing their contribution to 'cleaning up' the environmental consequences of consumption by the Rich. One *misguided* example is the recommendation that the Poor should not go one or two steps up the ladder of cooking fuels but, on the contrary, should go on using fuelwood, if not dung, if need be by making available more wood by programmes of 'social reforestation'.

In large areas of the Poor's world, there is no fuelwood crisis. Deforestation in the humid tropics comes from cattle ranching, mining, sometimes because of migratory agriculture, and wood exports, but there is always more than abundant wood around for cooking. In the highlands of the Tropics, also in semi-arid zones, there *is* a fuelwood crisis. Figures in the region of 500 kg to 1000 kg of fuelwood per person per year (i.e. two to four times more than the energy-intake for food) are quoted often, and they are plausible because of the extremely low efficiency of open fire 'kitchens'. So, another recommendation, beyond 'social reforestation', is the introduction of more efficient kitchens. This makes sense. However, the appropriate-technology kitchens for fuelwood must be introduced through the efforts of NGOs while gas kitchens (which are much more energy efficient) are introduced commercially. There is nothing against increased energy efficiency in general, although in many rural places in the world, certainly at least in oil exporting countries, such as Nigeria or Mexico, and in all cities (in India, for instance), a strong case could be made for achieving increased energy efficiency by substituting gas kitchens (socially well received) for fuelwood or charcoal kitchens, since this would diminish the amount of energy used and also the amount of CO_2 emissions. We find, however, the World Bank arguing against this, both because of a fundamentalist position against subsidies, and because there is perhaps the implicit wish to keep oil supplies for the rich countries. Given the distribution of income, in order to move the Poor up the cooking fuel ladder, either subsidies to kerosene or LPG or a redistribution of income would be needed. In this case, there is no strong conflict between increased incomes for poor people, who will upgrade their fuels, and the environment, since there will be less deforestation (in arid and tropical highland regions), and there is no threat to the security of future generations, as we are speaking of relatively small

amounts of fuels. Of course, in due course photovoltaics would be even more ecological, but my point is that a more equal distribution of income in the world would imply a different pattern of use of fossil fuels. This would increase energy efficiency, and at the same time would stop one of the main causes of deforestation in some areas of the world.

INTRODUCING AGRICULTURAL BIODIVERSITY

As regards CO_2 emissions (which is one of the main causes of the increased greenhouse effect), the main lines of conflict are, as we have seen, fairly well drawn. Solutions are prevented by distributional conflicts. Biodiversity was the other star issue at the Rio conference, and it raises questions for environmental policy which are more difficult to analyse than the increased greenhouse effect. Also, the distributional conflicts are barely understood even by the social actors themselves since it is only now that a widespread awareness of the value of agricultural biodiversity is arising in poor countries. Some of these countries comprise the original 'centres of biodiversity' (e.g. maize in Mexico and Central America, potatoes in the Andes, cassava in Brazil-Paraguay...). Moreover, in such countries there are still poor farmers, experts in traditional plant breeding, practising 'clean technology', and low-input agriculture based on hundreds of 'landraces' (which Pat Mooney has proposed to call 'folkseeds').

The threat to such agricultural biodiversity comes mainly from the market advantage to be gained by switching over to modern agriculture and the High Response Varieties. Questions arise as to the value that agricultural biodiversity has now and will have in future (as assets of 'cultivated natural capital' which cannot be substituted by the products of modern plant breeding or genetic engineering), whether such value which the market leaves aside ought to have a chrematistic translation, and who should collect such monetary revenues. Also, what should be transacted? The right to use such traditionally improved varieties without excluding other users, or the acquisition of their property? There is also the issue of the complementarity between agricultural biodiversity and the biodiversity of wild life, which is the main platform of bodies such as the WWF, and far more emphasized than agricultural and agroforestal biodiversity in the IUCN's conservation strategy.[20]

Agricultural genetic resources as 'cultivated natural capital' are not a substitute for, but a complement to the human-made capital equipment used in modern agriculture; in its turn, such 'cultivated natural capital' needs the complement of 'natural capital', i.e. the wild and weedy relatives of the same species of cultivated plants.[21] The ethnobotanical diversity of the Poor has been recently emphasized by different authors, inside a wider framework of agroecology based on indigenous, peasant knowledge which continuously evolves.[22] Agricultural biodiversity cannot be understood unless we understand also the whole

human-ecological complex of each society which has managed to create, preserve, and further create such wealth of genetic resources. They are valuable, but such value is not easily translatable into money terms. The crucial question is whether genetic resources in general (those from the wilderness, those from traditionally improved varieties, those from modern varieties, and those genetically engineered) should be commercialized or should remain the 'patrimony of humankind'. Genetic resources produced by traditional plant breeding and collected in the fields up to now have not been paid for, while firms selling modern improved seeds insist on payment for them, and the products of genetic engineering will be not only sold, but monopolized through a patent system.

A new socio-political movement (part of a worldwide slowly emerging trend of *ecological neo-narodnism*) will be able to use the ecological critique developed in the Rich countries over the last forty years, against modern agriculture. In Western Europe and the USA, agricultural historians and agricultural economists have paid almost no attention to the biological impoverishment of modern agriculture, swept under the carpets of 'increases in productivity' of conventional economics or 'development of productive forces' in mainstream Marxist historiography; but starting even before Rachel Carson in 1962, there had been a number of local episodes against the use of pesticides. For instance, techniques of Integrated Pest Management were used in coastal Peru, in the cotton plantations of the Cañete Valley in the 1950s,[23] even though at the same time there was in coastal Peru a successful campaign to eradicate pre-hispanic varieties of coloured cotton, as sources of pests for the commercial cotton plantations. This campaign is now regretted by Peruvian agronomists.

Some years after alarm over the use of pesticides arose in different parts of the world, another approach was taken in order to understand and criticize modern agriculture. This was the study of the flow of energy in agriculture[24] which showed that modern agriculture made an increasingly inefficient use of outside energy inputs, while traditional agriculture had used no other energy source from outside agriculture than sun energy. The question was immediately asked by ecological economists whether the increased economic productivity of modern agriculture was merely an artefact of the low price of fossil fuels. Discussion of this issue continues to this day. It figured as a political argument in the SAM programme for food security in Mexico in the early 1980s.[25]

While a traditional peasant farmer, if he or she has rights to land, will automatically also have access to sun energy and at least as much water as it may rain on his or her land, and will also command a 'fourth resource', i.e. the seed for his or her crops, modern farmers depend much more on an external energy subsidy from fossil fuels. They are also more polluting. And they have lost control over the 'fourth resource'.[26] Here again we could do some archeology of ideas,[27] tracing back long ago the first use of expressions such as 'genetic erosion', not as an exercise in erudition but in order to show how ignorance of the ecological and social impacts of technical change was socially hidden under

the ideology of progress.[28] Thus, peasant farmers have insisted in sowing traditional varieties not because of the recent efforts by ethnobotanists and the agronomic institutions, and certainly not because of monetary incentives, but because their logic has not only been the logic of the market. In Mexico, hybrid maize has *not* yet taken over. In the rich countries, the extension of the market meant great, ignored losses of genetic resources, rarely mentioned in textbooks of agricultural history. Perhaps in the poor countries an ecologically-extended market, where genetic resources are properly valued, would combat genetic erosion.

The economics of technology took as a classic case the study of the rate of return on the research and development of hybrid maize in the USA fifty years ago.[29] The ecological context was left out. No item measured the costs of the loss of biodiversity which makes hybrid maize in the USA dependent on the imported genetic wealth of Mexican folkseeds and wild varieties; this was given away gratis, a beneficial externality to USA agriculture for which there was no market, and which therefore had no chrematistic value. The development of hybrid maize, and later of the HYV of wheat and rice, gave a large impulse to the process of genetic erosion which is a corollary of the new farming system based on mechanization and a monoculture in every field.

There is now an increasing awareness that the history of modern agriculture is a history of biological impoverishment. Renée Vellvé has shown in a recent book focused on the European experience[30] that modern agriculture has replaced diversity with uniformity, and security with vulnerability. What is being done in practice in order to safeguard genetic resources for the future, so as to escape the contradiction between apparent increases in agricultural productivity and the destruction of the genetic resource base? Vellvé concludes that genetic resources are increasingly vested in industrial, multinational hands, while the efforts of public institutions for *ex situ* storage in genebanks suffer many drawbacks. There is however a third actor, and not only in countries of the South which are the main repositories of agricultural biodiversity, but also in Europe, where the crucial conservation work has been done by individuals and grass roots organizations, in an example of popular environmentalism, underfinanced, unrecognized.

Since the so-called improved varieties of modern agriculture cannot do without a continuous flow of new genetic resources in order to cope with new pests and new environmental challenges, and since they provide a short-run economic advantage (in the chrematistic sense) over traditional agroecology, the growth of production for the market undermines its very conditions of production, i.e. agricultural biodiversity, and a new socio-ecological movement was born, and now is growing, in order to resist this degradation.[31]

FARMERS' RIGHTS

Modern agriculture, which represents a radical ecological break, has used the biodiversity of the Poor in order to produce new varieties, such as the HYV (or High Response Varieties) of the Centres of Agronomic Research grouped in the CGIAR, whose headquarters are not in FAO in Rome, for instance, nor in any other UN institution, but at the World Bank in Washington DC.[32]

The flow of genetic materials, and the incorporated knowledge (which is inevitably lost to some extent when the seeds stored *ex situ* are divorced from the farmers' knowledge) has not been paid for, a further item in the Ecological Debt which the Rich owe to the Poor. Nowadays, there is increasing awareness in many poor countries that their agricultural systems use cleaner technologies and are genetically richer, and that this should not be an economic liability as it is at present. Pride in the agronomic achievements of traditional, 'clean' agroecology is born with the awareness that the Poor were giving away beneficial externalities, and it is also a manifestation of a much wider phenomenon, the Environmentalism of the Poor.

Sometimes, a little has been paid for the traditionally improved varieties, a cheap peasant price for folkseeds bought in peasant markets, and then shipped to gene banks *ex situ*. Nobody pays for medicinal plants discovered and nurtured by indigenous knowledge, which are then developed by pharmaceutical firms which charge prices, and royalties, for their medicines. In contrast with medicines, the modern improved seeds have not been patented. Protection against duplication by farmers was secured to some extent, not by a legal monopoly, but by selling hybrid varieties, or varieties which degenerate quickly. It seems that the new legal framework required by the biotechnological industry will allow patenting 'forms of life', including agricultural genetic resources. This is why GATT is now pushing for the international recognition of patents on 'new' genetic materials (as it has always tried to do for medicines), while some CGIAR's centres are now proposing to take patents on the genetic resources they hold.[33] Activists in the agroecological movement (GRAIN, CLADES...) are against the patenting of 'forms of life'. In this they concur with many other Green activists who fear that the development of biotechnology, with its promises and menaces, will be subject only to the logic of the market. Specifically, agroecologists are against the patenting of the genetic resources in the CGIAR's centres. They are in general against Intellectual Property Rights, in the sense that they do not think this is the appropriate way to defend and reward agricultural biodiversity. They are somewhat divided over the issue of Farmers' Rights, which would be paid to farmers or farmers' organizations, or governments of poor countries, for the labour and knowledge in traditional plant breeding.

Payments for Farmers' Rights would not buy the exclusive use of such genetic resources, they are not the equivalent to buying Intellectual Property Rights, the analogy would rather be a fee or honorarium for professional

services. It would be like paying to the owners of a protected area, where wild plants and animals grow, a fee for the right to visit and collect a few superfluous specimens, which the knowledgeable owners would identify for us. To give another analogy: while patents (like author's copyrights, or business' trademarks, or in general Intellectual Property Rights) are monopolies granted to inventors or creators, as an incentive to creativity and a reward for the investment of time and money, there are other ways to reward inventions, like bonuses, prizes, and honours – Farmers' Rights would belong rather to this latter category. From the economic point of view, the issue is to provide the required incentive to secure the conservation and further development of agricultural biodiversity, but some agroecological activists think that the payment of Farmers' Rights will interfere with the peasants' own non-market logic for maintaining and increasing biodiversity, without really implying a considerable transference of money from the Rich to the Poor in exchange for such non-exclusive right to use the improved folkseeds. Perhaps it would be better (from the point of view of conservation) to keep *all* genetic resources as the 'patrimony of humankind', at the same time introducing social and legal safeguards against dangerous or absurd applications of biotechnologies (such as increasing plant resistance to pesticides, instead of resistance to pests), and establishing also an economic compensation *via product prices* (or income transferences) for the producers of low-input, 'clean' agroecology so that they will be induced to preserve and further develop their traditional biodiversity.

The technologies of modern agriculture outcompete the products of 'organic' farming in the large markets. There are small, specialized markets for products of 'organic' farming which command higher prices. A massive change in consumers' preferences could change the economic advantage which now favours the adoption of modern technologies; this might slowly come about through ecological awareness and consumers' education. However, since many of the damages caused by modern agriculture will have impacts only in the long run, much depends on the weight that the present generation gives to the uncertain needs of future generations. It is likely that the conflict between economy and ecology will stay with us: therefore the issue of Farmers' Rights as payments for a specific environmental resources will also stay in the political agenda for some time. Who in any case would be the recipient of Farmers' Rights? Farmers' organizations? Individual farmers? Governments? What would be their price? Apart from the immediate use value of folkseeds, there is also their option value, even perhaps their existence value, although many would be readier to apply the notion of 'existence value' to wild biodiversity than to a humble domesticated variety of potatoes. The reality is that *peasants and indigenous peoples are likely to set a low price to their hypothetical Farmers' Rights*, not because they themselves attribute a low social value to their labour and agronomic knowledge, and not only because they give a low present value to the benefits from biodiversity for future generations, but also *because they are poor*.

THE POOR SELL CHEAP

The expansion of market exchange implied not only the actual inclusion in the market of inputs and products which were outside it, but it also implied, on another plane (emphasized by Martin O'Connor, following Baudrillard), the *ideological appropriation* by capitalism of elements of nature hitherto external to the market system. Thus, the ecologically-extended market implies giving *chrematistic significance* to environmental resources and functions which were outside the market. Agricultural genetic resources and the Earth's CO_2 sink function were outside the market, but they were of great ecological significance for the human economy (in the sense of *oikonomia*). Once humankind has been immersed in a generalized market system (and it also has grown in numbers, and for some groups in the exosomatic consumption of energy and materials), then the lack of market valuation of such resources and services which were the common patrimony of humankind perhaps led to a wasteful use of them. Hence the idea that, in principle, placing chrematistic values on environmental resources and services would be conducive to a more ecological economy, and that, in these instances, it would also favour the Poor. Therefore, further negotiations after Rio on the increased greenhouse effect, and on biodiversity, might eventually be conducted under the proposals outlined in this paper, which imply a redistribution of income as part of such environmental policies. How large the redistribution of income would be is impossible to say, because we cannot know what the price of such environmental resources and services would be. We are aware, however, that the poor sell commodities cheap, and they also sell cheap environmental commodities. There have recently been some glaring examples of this.

The first example is the low indemnities for the victims of the Bhopal disaster (in a settlement approved by the Courts in India): indemnities which were lower (although the criminal case is still pending) than the indemnities already paid for the Exxon Valdez oil spill. Here one sees the truth contained in the memorandum "Just between you and me" by Lawrence Summers, chief economist of the World Bank: "The measurement of the costs of health-impairing pollution depends on the foregone earnings from increased morbidity and mortality. From this point of view a given amount of health-imparing pollution should be done in the country with the lowest cost, which will be the country with the lowest wages. I think the economic logic behind dumping a load of toxic waste in the lowest-wage country is impeccable and we should face up to that."[34] Union Carbide would have been bankrupt by the damages to be paid, had the accident taken place in a North Atlantic country.

The second example is the Costa Rican deal with the Merck company in 1992, through INBIO (Instituto Nacional de Biodiversidad).[35] It is not a case of agricultural genetic resources but rather of 'wild' genetic resources, but it is most relevant to my discussion. While the World Resources Institute[36] typi-

cally praises the "recent agreement between a major drug company and Costa Rica (which) deserves to be widely copied" the deal is creating in Latin America a major uproar, not least because Costa Rica shares genetic resources with neighbouring countries. The deal implies, of course, the recognition of rights on genetic resources ('wild' resources, in this case) but, on the other hand, it gives no assurance that traditional knowledge and the conservation of biodiversity will be able to compete by themselves with other land uses which give a higher rate of return in the market. The deal is for one million US$ to be paid in two instalments for exclusive access to the information in a large amount of samples collected by INBIO from a large protected area of Costa Rica. The deal also includes the payment of a royalty by Merck on any commercially valuable products developed from those samples. Barring some extraordinary piece of luck, it is a low price, in the sense that 'existence' value is not paid for, and also in the sense that the immediate utilitarian value is low, and that perhaps nothing profitable will come out of the chemical screening by Merck. Unless there were additional costly measures for conservation (legal regulation, police vigilance) paid for by the Costa Rican authorities or private foundations, plus the self-interest in conservation of parts of the local populations, the small chrematistic incentive provided by Merck would be too low to prevent deforestation and genetic erosion. However, it is only normal that Costa Rica should sell cheap.

There is a parallel here with debates within the feminist movement some years ago. The analogy is not far-fetched, since the debates were connected with the same root economic cause (the failure of the market to measure services essential to the human economy, in the sense of *oikonomia*). Should the reality of unpaid domestic work given by women because of their social subjection, be denounced at the moral and political plane, and changes be sought to the unequal distribution of labour by moral persuasion and social changes, or would it be a good idea to give *chrematistic significance* to such work by attributing to it a domestic wage, similar to the wage the market determines for domestic work by outside help? Peculiar labour markets make such remunerated domestic work relatively cheap, but apart from this, many feminists felt that a domestic wage would add insult to injury, since the social value for the *oikonomia* (for the human economy) of caring for children and for the family would not, and could not be properly reflected in a price established by market criteria.

In the case of environmental externalities there is the further issue of distant intergenerational effects. There is no guarantee at all that the ecologically-extended market in which today's preferences are expressed will give sufficient importance to future needs. The non-born cannot come to the market, whether ecologically-extended or not. The implicit discount rates might be too high, not only because of selfishness but also because of exaggeratedly optimistic views regarding technical progress and economic growth. But, apart from the short time horizons they might share with the Rich, there are other reasons why the

Poor sell cheap. First, the distribution of assets in the world is very unequal. Second, the world labour markets are terribly segmented, by racial discrimination, gender inequality, unequal access to education, and not least by practically forbidding poor people to move freely in the world, as we see in the many deaths at sea in Haiti and Morocco. In the third place, while free mobility is practically forbidden, on the other hand open markets are forced upon people; nobody is allowed in practice to live outside the market. Even subsistence peasants cannot retreat from the market if they have not enough land, nor sufficient water, nor their own seed. In such circumstances, poor people will have to sell cheap commodities, they will also sell cheap environmental resources, and they will accept pollution cheaply. Thus, in the history of the world economy, even when rights to health protection are instituted due to pressure from labour unions or international norms, free wage workers in poor countries who suffer a disproportionate share of environmental hazards (in mines, in plantations) accept such hazards cheaply, if not gladly.

If the Poor sell cheap, the environmental resources and functions which they would own, once suitable ownership rights were established (as argued in this paper), are likely to reach low values once they are brought to the market, and therefore the ecologically-extended market will not necessarily direct the economy towards sustainability.

THE ENVIRONMENTALISM OF THE POOR

I have argued that the establishment of new property rights over environmental resources and services might work to the benefit of poor sections of the population, although perhaps their very poverty will lead to a low valuation of such resources and services in the ecologically-extended markets. The fact that the poor put low chrematistic values on the environment, which can be expressed by the aphorism 'the poor sell cheap' (it could also be called 'Lawrence Summers' principle'), does not mean however that the poor have no interest on the environment. Rather the contrary.

One prevalent interpretation of environmentalism sees it as a movement of relatively affluent populations which arises because of a shift from materialist to 'post-materialist' values. Thus, in rich countries, forests and even the maintenance of agricultural landscapes are increasingly seen as 'quality of life' issues, while in most of the world full use of forest products and of agricultural production is essential to the precarious livelihood of the population. People can afford in rich countries to care about clean air, while in most of the world air pollution is gladly accepted as a sign of industrialization. Another interpretation of Western environmentalism contends, from the opposite angle, that the economies of rich countries are *not* 'post-materialist' but, on the contrary, they use and destroy natural resources and services at much greater rates per capita

than the economies of poor countries. Thus, the movement against the civilian use of nuclear power was born in the 1960s and 1970s in countries which have high rates of consumption of electricity per capita. Movements against industrial toxic waste arose because of the high level of consumption of chemicals which characterizes rich countries, although here it should be noticed that the geography of waste dumping often discriminates against relatively poor communities inside rich countries. The movement in favour of organic agriculture was a reaction against the high level of fossil fuel energy and of pesticides in the rich economies, and also against the loss of biodiversity. The movement in favour of recycling domestic waste came about because the amount of waste (over one kilogram per person per day), and its composition, made it difficult or dangerous to dispose of it in wastedumps or incinerators. Such environmental movements react against 'the effluents of affluence'. In fact, if the preservation of forests appears to be in the West a question of 'quality of life' rather than livelihood, the reason is that the functions which the forests fulfilled (as sources of woodfuels, of building materials, of medicinal plants) are now performed in other ways which certainly are not less materialistic (cooking with electricity, building with cement, glass and aluminium, or with imported tropical woods).[37] If agriculture is increasingly seen in the Rich countries as a way of preserving green landscapes, enhancing the 'quality of life', this is because agriculture and meat production make such intensive use of external inputs that surpluses are produced, as it is the case even in overpopulated, carnivorous Western Europe. Green policies of reafforestation on agricultural land now set aside are proposed. Such high agricultural productivity does not arise from a 'post-materialist' recipe but rather from the intensive use of external inputs which results also in large material flows of waste. The environmental movements of the Rich, born in reaction against high levels of resource use and waste, could be called the Environmentalism of the Rich, the Ecology of Affluence.

Both the 'post-materialist' and 'materialist' interpretations of the Environmentalism of the Rich have some merits. My point here, however, is rather to analyse another type of Environmentalism which arises from materialist concerns, the Environmentalism of the Poor, the Ecology of Survival. The focus here is not on the search for 'quality of life' once material needs are satiated. It is again on the social responses against resource depletion and the production of waste, which in rich countries may occur because of a generally high standard of living, but which may also occur because of increasing inequality in the allocation of resources (internal to each country, and internationally). Some sections of the population make such large use of environmental resources and services, that they deprive the poorer sections of the population of their access to them. The reaction against this could be called the Environmentalism of the Poor, or the Ecology of Survival (or Ecological Neo-Narodnism), in so far as it demands equitable and non-destructive use of natural resources and services for livelihood, and not for commercial gain. In the Conclusion, I shall reconsider the main

issues of this paper (the attribution of property rights on some environmental resources and services and the values that such rights would achieve in the market) in the light of this notion of the Environmentalism of the Poor.

CONCLUSION

In the aftermath of the Rio conference, this paper has addressed the issue of distributional obstacles to environmental policy. The Brundtland Report of 1987, which has dominated discussions over the past few years on the relations between inequality and environment, took an easy way out by adopting the convenient view that both poverty and environmental degradation might be alleviated by overall economic growth (called 'sustainable development'). After all, Brundtland herself is a social-democratic leader, and the position of Social-democracy has always been favourable to growth rather than redistribution, and this worked apparently well (in Western Europe) in the Keynesian era. Ecological considerations have only recently become part of the Social-democratic perspective, mainly because of challenges by Green political parties. It is only natural that the first approach has been that ecological problems can be solved by growth. This comes as easily to Keynesian social-democrats as the belief that the market has solutions for environmental problems comes to neoliberals. I have taken instead a more realistic view, showing why in general (although with some exceptions as in the case of fuels for domestic cooking, or atmospheric pollution with sulphur dioxide, or some aspects of public health) we cannot rely on economic growth as a solution both to environmental problems and to income inequality, because economic growth is unsustainable from an ecological point of view. Therefore, distributional obstacles to environmental policy should be removed by redistribution rather than growth. This general point of view has been discussed with reference to two concrete issues of particular importance in Rio, genetic erosion, and the increased greenhouse effect.

The Poor, through their conservation and creation of agricultural genetic diversity, and through their disproportionately low use of the Earth's CO_2 sink function, have made contributions to sustainability. These contributions have not been rewarded through the market since no rights were established on such environmental resources and services. Rio missed the opportunity to establish such rights, as a step towards effective agreements on the greenhouse effect and on biodiversity. However, if such rights were instituted, the question remains of the prices at which they would be transacted. Inequality and poverty would possibly depress their supply prices. The attribution of *chrematistic significance* to environmental resources and services does not, therefore, provide a guarantee for their conservation, and might even be counterproductive. Rights and money values are a weak substitute for social responses. In fact, in the Environmentalism of the Poor, the most frequent type of action (as in the Chipko movement,

or by Chico Mendes) *denies* the inclusion of environmental resources in the generalized market system, and tries to keep them in the non-market sphere of a 'moral economy' (in E.P. Thompson's or J. Scott's sense). In the case of Chico Mendes' *reservas extractivas* (which were actually *productivas*) it has been argued sometimes[38] that the production in terms of rubber, Brazil nuts and other resources, was in money terms able to compete with the agropastoral use of the land already in the short term, without counting the negative externalities of the latter, were it not for the direct money subsidies to cattle ranching. This might well be true, but Chico Mendes' movement arose as a non-violent social response, by people who made a sustainable use of the forest, against its privatization and commercial use; it did not appeal to market advantage. In this, it is quite similar to the Chipko movement,[39] or to other social movements against the expansion of the market and its threat to livelihood, for instance, movements in India which try to prevent water needed for domestic use, or for the irrigation of food gardens, being used for commercial sugar cane plantations.[40] The livelihood of the Poor, their material provisioning (i.e. *oikonomia*) is for them too crucial to be left to the results of market exchanges (*chrematistika*). This is not because, *as environmentalists*, they refuse the merchandising of nature. In fact, movements such as Chipko or the rubber tappers in the Brazilian Amazonia, and the thousands of similar movements in history and at present, cannot be described only as environmental. Chico Mendes was a union leader. The Chipko movement has a long history behind it, going back to British control and commercial policy over the forests in colonial India, much before the word 'environment' became political. Chipko, which is an environmental movement, is also a peasant movement, with feminist components. The emphasis on a 'moral economy' is not environmental posturing but rather a spontaneous reaction against the threats coming from the generalized market system against the livelihood of the poor. Therefore, the main proposals considered in this paper, on payments in money for Farmers' Rights on agricultural genetic resources, and payments in money for rights to the CO_2 sink function, coming as they do from NGOs identified with the Poor, are somewhat surprising as instances of 'Environmentalism of the Poor', because they wish to give chrematistic significance to resources and services which up to now were outside the market. The measures proposed are weak in two senses. First (and this has not been the main point of this paper), they do not secure at all the demands of future generations. In the second place, if the Poor sell cheap, such payments would be low, and perhaps would not provide a strong environmental inducement. Nevertheless, even such weak measures would imply a flow of money from the Rich to the Poor (because of the actual geographical and social distribution of CO_2 emissions and of agricultural biodiversity), and they would also put on the table the issue of the Ecological Debt which the Rich owe to the Poor on account of past emissions of CO_2, non-paid for collection of genetic resources, and destruction of biodiversity. For these reasons, such weak meas-

ures were not agreed at Rio. It is still doubtful whether they will provide a basis for further negotiations on the greenhouse effect and on agricultural biodiversity.

NOTES

[1] Previous versions of this paper were presented at the 2nd meeting of the Int. Soc. for Ecological Economics, Stockholm, 3-6 August 1992, the 27th Congress of the Int. Geographical Union, Washington DC, 10-15 August 1992, the conference organized by the Latin American Centre of the University of Oxford on "Latin America and Europe, 1992", 9-11 Sept. 1992, and the meeting of the Transnational Institute, Amsterdam, 20-21 November 1992.

[2] With funding from DG XII of EEC, Brussels, through the Institut fuer Oekologische Wirtschaftsforschung, Berlin, and from the MacArthur Foundation, Chicago, through the Social Sciences Research Council, New York.

[3] I do not wish to gloat over the failures at Rio, although many ecological activists noticed with interest that the world political establishment and the international ecotechnocratic would-be establishment did not manage to take over the environmental show. The best show in Rio was still the alternative, Green conferences, at the Global Forum.

[4] I owe this formulation to Joan Pasqual, Dpt. of Applied Economics, Universitat Autònoma de Barcelona.

[5] I.e. the North (which is not an appropriate name because there are rich countries in the South), or the First World (but then how should the Third World be called now? Should it be upgraded to Second World?).

[6] Agarwal and Narain 1991.

[7] Taken from Leff 1986, and from O'Connor 1988, possibly anticipated by other writers.

[8] Cf. Patiño 1991 (for Puracé), and Diaz Palacios 1988.

[9] Funtowitcz and Ravetz 1991. Also in Costanza1991.

[10] Even though there are also NIABY cases: 'not in anyone's backyard'.

[11] Cf. Luke 1992.

[12] *Green Agenda*.

[13] Cf. the outstanding report by Daly and Goodland (1992).

[14] For instance, *New York Times*, 15 August 1992, p. 34.

[15] Some critical writings on trade and environment: Arden-Clarke 1991; Daly and Cobb 1989, chapter 11; Ropke 1992.

[16] See in comparison Markandya 1991.

[17] Grinevald 1990.

[18] World Bank 1988, p.57.

[19] Schramm 1987, Foley 1985.

[20] McNeely et al. 1990.

[21] Herman Daly's classification includes Natural Capital, Human-Made Capital, and also, as a special case, Cultivated Natural Capital. He has discussed the question (which was raised already by Frederick Soddy, of Oxford, very explicitly) of whether such categories of Capital are substitutes or complements. Ecological economists have insisted that natural resources should be called natural capital, for two reasons. First, the change in name points to the lack of amortization provisions for natural resources. Second, the

change in name points to the problematic nature of the substitution of capital for natural resources as in orthodox production funtions. However, the change in name also might mean that resources which were not produced as commodities and which were not commodities (traditional agricultural genetic resources, or the Earth's CO_2 cleaning facilities) should now be treated as capital, i.e. commodities.

[22] Richards l984; Guha and Gadgil 1992; Toledo 1988, also in *Ecología Política*, nº 1, 1991; Toledo 1989; Posey 1985; Descola 1988; Rocheleau 1991.

[23] Conference paper in Farvar and Milton (l972).

[24] Pimentel et al. 1973; Leach 1975; Naredo and Campos 1980.

[25] Schejtman l983, 1987.

[26] This is Henk Hobbelink's description. He is the founder of GRAIN (Genetic Resources Action International), a NGO based in Barcelona which provides information on the importance of and the threats to agricultural biodiversity. See Cooper et al. 1992, also Querol 1987.

[27] As we did for the history of the study of the flow of energy in agriculture (Martinez-Alier 1990).

[28] Mario Tapia in Peru has been writing a history of the Andean scholars who started the tradition of collecting peasant varieties in the 1920s and 1930s.

[29] Griliches 1958.

[30] Renée Vellvé (of Genetic Resources Action International) 1992.

[31] This fits in with James O'Connor's notion of the 'second contradiction' under capitalism, cf. O'Connor 1988.

[32] The reason is that the CGIAR is controlled by the so-called 'donor countries'. By donor countries are understood the countries which finance the CGIAR's centres, not the countries whose farmers donated the genetic resources now stored *ex situ* in the Centres for Agronomic Research.

[33] Hobbelink 1992.

[34] "Let them eat pollution", *The Economist*, Febr. 8, 1992.

[35] Brugger and Lizano 1992, pp. 289-293.

[36] *World Resources 1992-93*, p. 10.

[37] Moreover, the forests are now seen again by the Rich in terms of livelihood because of the services they perform as sinks for carbon. This is why in Rio there were attempts to impose an agreement on International Principles for Forests, which would deprive not only local communities but even independent states of control over the forests, which would be vested in international ecological managers.

[38] Cf. Aragón 1991.

[39] Guha 1991.

[40] Rao 1989.

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