

STEPS TOWARDS A GLOBAL ENVIRONMENTAL POLICY

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What steps need to be taken towards a global environmental policy? In order to formulate and implement environmental policy effectively it is necessary to get the consensus and the consent of the people, as well as that of governments and international institutions. For this reason, a "top-down" approach has to be applied. In discussing this subject, I will focus on three questions:

1. Why do we need a global environmental policy? What are the driving forces of environmental degradation? What are the effects of those driving forces?
2. What has the global environmental policy been so far? How did it develop? What were the strategic decisions made?
3. What is ahead for the future? How will environmental policy change? Are there new initiatives, new instruments and new institutions in the making?

Why do we need a Global Environmental Policy?

The world is getting increasingly populated. This is a simple but very important statement. Industrialisation has served as a catalyst, converting a rather empty world into a rather full world (Figure 1). But how full is the world?

We only have some preliminary answers to this question, but we know that, at least, 40% of what the earth offers as net primary production is already being used by humankind. The predictions of the United Nations Population Fund, and other international institutions, are that world population will double again during the next century. This would mean that moving from the use of 40%, to 80% of the available resources is unavoidable, and that only 20% additional growth is possible.

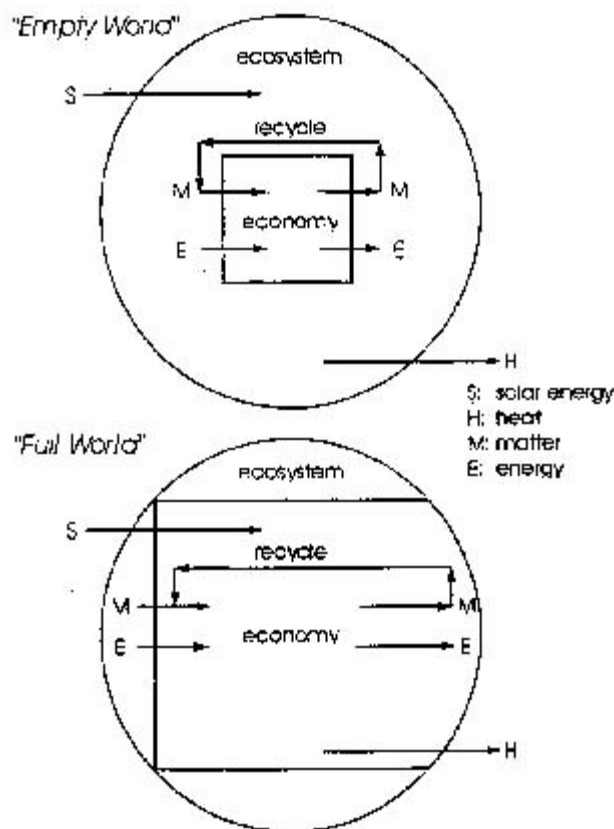


Figure 1. The economy as an open subsystem of the ecosystem

Besides population growth, there is a second major driving force which causes concern, and that is the increasing demand for natural resources

by the economy. Just consider the difference between what modern humans are doing with nature and to nature, compared to pre-modern humans, in the form of daily per capita flows (Figure 2). Human beings are utilising more and more resources, and in this way they are partially overburdening the absorption capacity of the earth's ecosystem (Table 1).

A major factor behind climate change, for example, is the increase of greenhouse gas emissions. The industrial countries are leading the ranks of CO₂ emissions, but the developing countries already account for approximately 50% of all greenhouse gases, one major component being methane emissions. Per capita greenhouse gas statistics are rather disturbing, with oil producing countries at the top of the list, but a service society, Luxembourg, following suit, and a mixture of small and large, developed and developing countries following next (Table 2).

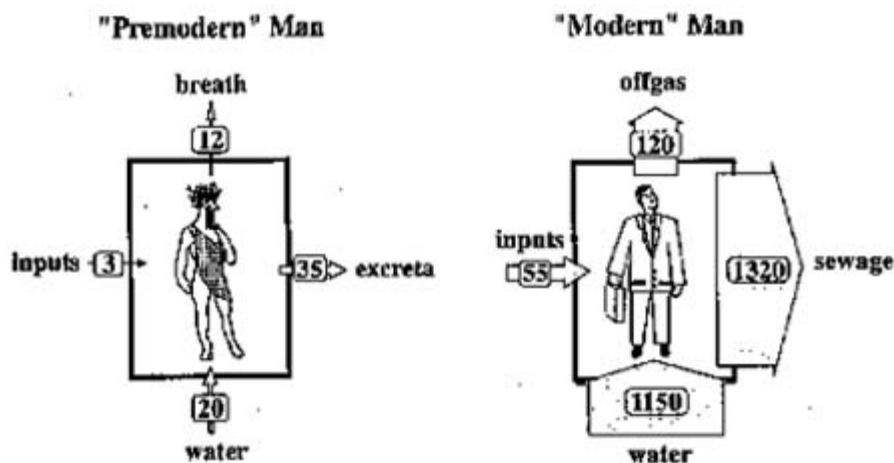


Figure 2. Daily per capita flows in kilograms

Table 1. Carbon Dioxide-Emissions

Rank	Country	CO ₂ Emissions (tons × 10 ⁶)
1	United States	4,931,630
2	Former Soviet Union	3,581,179
3	China	2,543,380
4	Japan	1,091,147
5	Germany	969,630
6	India	703,550
7	United Kingdom	577,157
8	Iraq	520,281
9	Canada	410,628
10	Italy	402,516
11	France	374,113
12	Mexico	339,873
13	Poland	308,164
14	South Africa	278,695
15	Republic of Korea	264,647
16	Australia	261,818
17	Korea, Dem. People's Rep.	243,235
18	Islamic Republic of Iran	222,361
19	Spain	219,877
20	Brazil	215,601
23	Indonesia	170,468
47	Philippines	44,587

Source: World Resources 1994-95

Entering all these factors into one equation, leads to the IPAT-Syndrome: Environmental impact is determined by population growth, affluence, global social product, and established technology (Figure 3).

These and other relations are now being simulated and debated by the Intergovernmental Panel on Climate Change (IPCC). One of the things we will put forth in this report is that a major effect of climate change is the rise in sea level, which may affect hundreds of millions of people, particularly in the large river deltas, as, for example, the Ganges and the Nile (Figure 4).

Although these relationships still have to be determined in greater detail, there are significant changes taking place, in the economy, towards what is known as "decoupling." However, do we have active decoupling of polluting activities and economic sectors from the gross national product (GNP)?

Table 2. Per Capita Greenhouse Emissions
Ranking of the 21 Countries with the Highest Per Capita Emissions, 1991

Rank	Country	Per Capita Measure*
1	Qatar	18.63
2	Gabon	17.03
3	United Arab Emirates	16.15
4	Brunei	11.51
5	Luxembourg	11.41
6	Iraq	10.84
7	United States	8.95
8	Bahrain	8.43
9	Australia	7.70
10	Bolivia	7.68
11	Canada	7.10
12	Bulgaria	6.74
13	Surinam	6.63
14	Trinidad and Tobago	6.53
15	Singapore	6.33
16	Venezuela	6.01
17	Saudi Arabia	5.95
18	Former Soviet Union	5.68
19	Norway	5.68
20	Denmark	5.61
21	Germany	5.54

*World Median = 1

Source: World Resources 1994-95

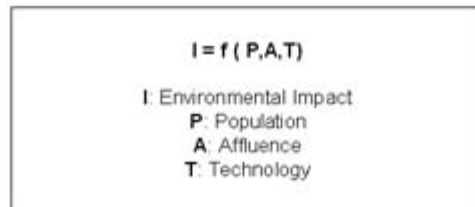


Figure 3. The Global Environmental Equation

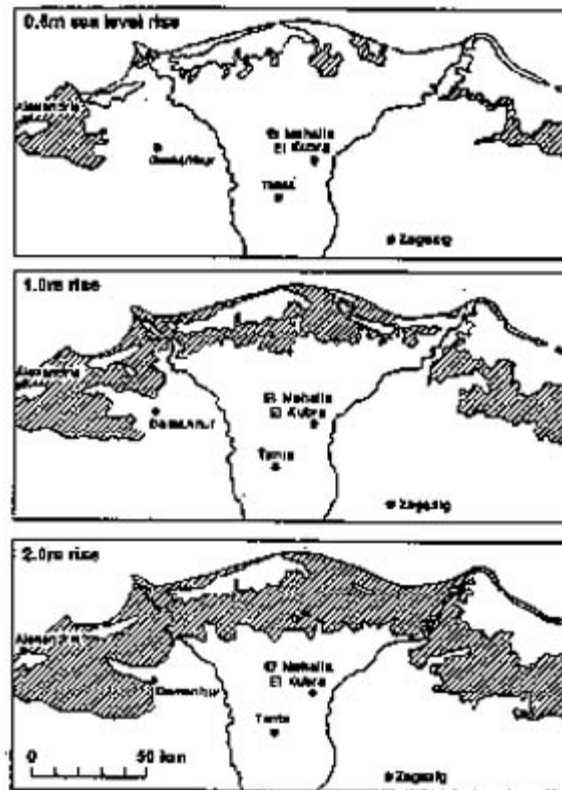


Figure 4. Predicted land loss on the Nile Delta from 0.5m, 1m and 2m rises in relative sea level, due to global warming and delta subsidence

There have been many empirical answers to this question but, the resulting picture is rather ambivalent. For example, there are countries like Sweden, where the growth rates of major polluting sectors, such as energy, steel, cement and transport, have been below the GNP growth rate (Figure 5), while there are others, like the former Soviet Union, where GNP growth has been accompanied by an even faster growth of sectors that are heavily polluting the environment (Figure 6).

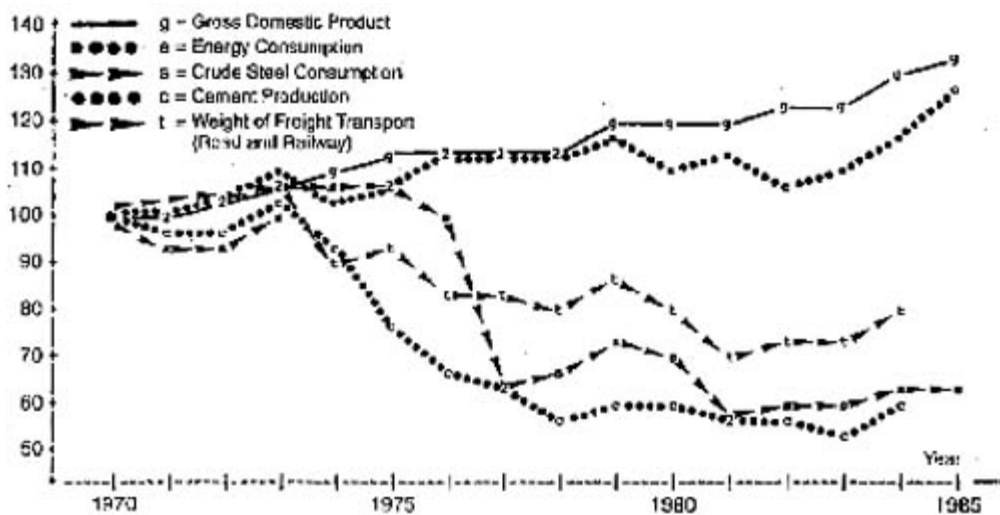


Figure 5. Structural economic change in Sweden 1970-1985 (1970=100)

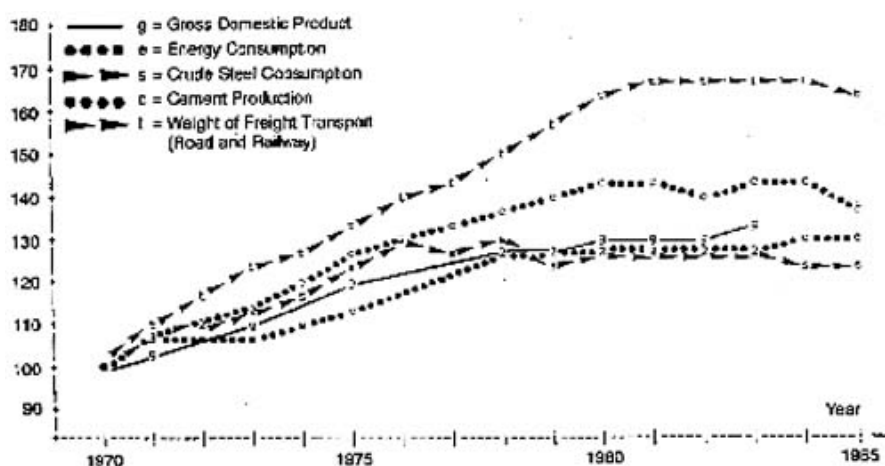


Figure 6. Structural economic change in the USSR 1970-1985 (1970=100)

- Decentralised Electricity-Heat Co-Generation
- Integrated Solar Technology (Biogas, Biomass, Windmills)
- Low Cost Photovoltaic Cells
- Efficient Rechargeable Storage Batteries
- Efficient Electrolysis Processes
- High Speed / Low Noise Trains
- Low Input Agriculture
- Biotech-Recovery of Heavy Metals from Sewage Sludge, Wastewater,
- Fly Ash, Dredge Spoil

Figure 7. Necessary Technological Innovations

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| <p><i>Reforming the tax system</i></p> <ul style="list-style-type: none"> • Impose / increase taxes on exhaustible resources • Impose / increase charges on emissions and wastes • Reduce taxes on labour • Introduce tradable emissions entitlements <p><i>Incentives for re-use / recycling</i></p> <ul style="list-style-type: none"> • Lease rather than sale consumer durable and investment goods • Re-use products and recycle dissipative materials • Develop a materials policy <p><i>Incentives for enlarging environmental sinks</i></p> <ul style="list-style-type: none"> • Nature protection programs - "Debt for nature swaps" • Afforestation programs - "Oxygen credits" • Adopt agroforestry |
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Figure 8. Socio-Economic Innovations

One of the conclusions that can be drawn from these examples, particularly by technical optimists, is that there is a need for various technical innovations; and there are, indeed, plenty of opportunities (Figure 7). However, technology alone cannot, and will not, solve all the problems. Some stringent socio-economic innovations are also needed, particularly in the form of an ecological tax reform. But what about additional full-scale incentives for reuse of products and recycling of materials? What about incentives for enlarging the capacity of nature to absorb emissions and wastes (Figure 8)? All this should be possible, yet it needs to be structured, somehow, through environmental regimes.

What has Global Environmental Policy been, so far?

Looking back into the history of global environmental policy formulation, one will easily discover that the steps followed were of quite a different kind (Figure 9). The major agreements reached, since the First Global Conference on the Environment, held in Stockholm in 1972, all followed a different strategy.

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| <ul style="list-style-type: none"> • UN-Conference on Human Environment, 1972 • London Dumping Convention, 1972 • Marpol-Agreement, 1973, 1978, 1983 (against pollution of the oceans) • UN-Conference on the Law of the Seas, 1973-1982, 1994 • Vienna Convention, 1985 and Montreal Protocol, 1987 <p><i>with subsequent amendments</i></p> <ul style="list-style-type: none"> London, 1990 Copenhagen, 1992 <ul style="list-style-type: none"> • UNCED, UN Conference on Environment and Development, Rio de Janeiro, 1992 <p><i>with two global conventions:</i></p> <ul style="list-style-type: none"> Climate Convention, 1994 Convention on Biological Diversity, 1993 and Agenda 21, 1992 |
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Figure 9. Steps towards a global environmental policy

The London Dumping Convention, on preventing pollution of the seas, for instance, gave a technical answer. Proposals were made on how to improve the safety of ships. A major difference came with the Conference on the Law of Seas, which was, in actual fact, an economic conference, focusing on the issue of property rights to determine the use of a common resource, the ocean. Nothing was really decided when that long conference finally ended, but years later, on November 18, 1994, the formulated convention came into effect. We now have a new legal situation with regard to the use and protection of the seas. With the Vienna Convention and the Montreal Protocol on substances that deplete the stratospheric ozone layer, for the first time in history, a product was phased out. Since January 1995, we stopped producing CFC's in Europe. Unfortunately, however, the use of these hazardous substances was not completely arrested, and production still continues in China, India and other developing countries.

Major steps forward were taken at the Rio Conference in 1992, namely the signing of the Climate Convention and the Biodiversity Convention. Implementing those conventions, however, is a tremendous task (Figure 10).

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| <p>Objective (Art. 2):</p> <p>The ultimate objective of this Convention and any related legal instruments... is to achieve... stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient</p> <ul style="list-style-type: none"> • to allow ecosystems to adapt naturally to climate change • to ensure that food production is not threatened and • to enable economic development to proceed in a sustainable manner. |
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Figure 10. United Nations Framework Convention on Climate Change

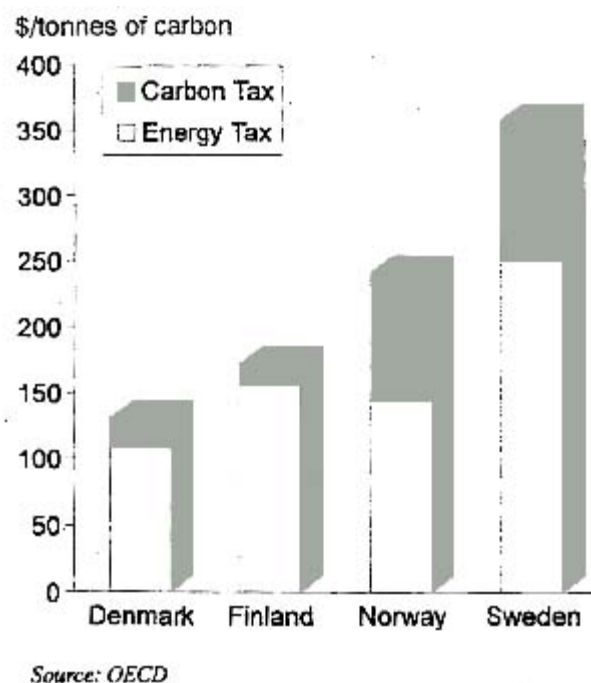
Article 2 of the Climate Convention shows how complicated and demanding that goal actually is, and how strong the debate could be about the conditions "...to allow ecosystems to adapt naturally," in view of what is happening in Europe, where 60 to 65% of the forests are heavily damaged. Does that mean naturally adapting to climate change? Dying seems to be something natural, is it not? The wording of international treaties is often very tricky, and the question is how to get tough, how to implement the goal and make it operational. No doubt, we have made some steps forward, but the world is quite diverse and global policy is still rather weak.

What Lies Ahead in the Future?

Inequalities have often been the cause for political debate, but also for political bargaining. Due to increasing environmental degradation, the equity issue is on the agenda again. In the future, this is going to be a major topic, not only with regard to the climate issue but, more so, with regard to the biodiversity issue. On the other hand, it seems that scientists have reached a valid conclusion on the climate issue, saying that for overall stability of the climate system in the next 50-55 years, global CO₂ emissions have to be reduced by 50% - or, to put it more positively: CO₂ consumption has to be increased by a factor of 2. This is not the whole story, however, because the industrialised countries are the major polluters, and therefore, need to decrease their CO₂ emissions by approximately 80% by the year 2050. Decreasing emissions by 80% may be interpreted as improving the present situation by a factor of 4.

Wherever I go and propose ideas like this, engineers in the audience say, "Oh, Professor, are you not demanding too much?" I then ask back, "What can you offer?" I am told that they can probably make it by a factor of 2, not 4. Then I count it down on the annual basis: Decreasing CO₂ emissions by 80% over a period of 50-55 years means increasing energy efficiency per year by 2.5-2.6%. Is that demanding too much to save the earth from climate change? Certainly not. But there is still a great deal of convincing work to be done to move in this direction.

Two major instruments of global environmental policy are being discussed. One is to introduce some kind of tax, for example an energy tax or a CO₂ charge. This topic is still controversially debated, although there are already four European countries that have imposed such a tax. The Scandinavian countries introduced a combined carbon charge and energy tax.

**Figure 11.** Average taxes on energy and carbon in four OECD countries

As we can see in Figure 11, different scales and combinations exist in those four countries. The conclusion, therefore, is that we cannot continue talking endlessly on the European level, we now have to get serious in the rest of Europe, and also in other parts of the world.

The second major instrument of global environmental policy is introducing emission certificates. Theoretically, this instrument is quite effective, and most economists would prefer it over a tax whose environmental effect is not similarly precise. Such certificates are a form of quantitative restrictions, and can and should be traded internationally; this would guarantee international economic efficiency and environmental effectiveness at one and the same time. However, there is a strong equity issue involved in allocating emission certificates. The following formula anticipates the major conflicts (Figure 12).

$$Q_i - Q_g \left[w_h \Phi_{0,i}^h + w_y \Phi_{0,i}^y + w_p \Phi_{0,i}^p \right]$$

Qi: The country in question ; Q: the emissions quota; g: the global emission target; w: the weight of the respective criterion (sum of w=1);
 h: historical emissions; y: Gross Domestic Product; p: population;
 Ö: the country's share in the global total; 0: the base year

Figure 12. Allocation of Emission Certificates

There are people who would argue that the industrial countries have not only depleted resources and polluted the environment, but have also contributed to improve the standard of living; therefore, a certain right may have arisen to continue the current way of life. Conversely, there is another group of people, particularly in the developing countries, who would say, "Wait a moment! We are all members of the United Nations and the Preamble of the UN Declaration says that 'all people are equal'. If this is so, how can you defend the average US American emitting more than 20 tons of CO₂ per year, while the average Indian is emitting less than 1 ton. Is such an unequal world sustainable?"

There might be a way out in the form of a smooth transition. We can take the world as is, and start with the current emissions or the emissions per unit of GNP, and then move slowly but continuously toward equal emission rights per capita. In the long term, there is certainly no option other than addressing this equity issue seriously. We will have an international debate on who is more equal than others and what fairness means. Certainly, there are many economic problems involved, questions of adjustment, growth, jobs, and competitive advantage. But in formulating and implementing global environmental policy, equity is going to be the hottest issue in need of serious debate, and in need of a fair solution.

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