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Global Environmental Problems - Searching for Adequate Solutions

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> "This is a story about four people: Everybody, Somebody, Anybody and Nobody. There was an important job to be done and Everybody was asked to do it. Everybody was sure Somebody would do it. Anybody could have done it, but Nobody did it. Somebody got angry about that because it was Everybody's job. Everybody thought Anybody could do it, but Nobody realized that Everybody wouldn't do it. It ended up that Everybody blamed Somebody when actually Nobody asked Anybody."
>
> *N.N.*

1. Global and universally occurring environmental problems

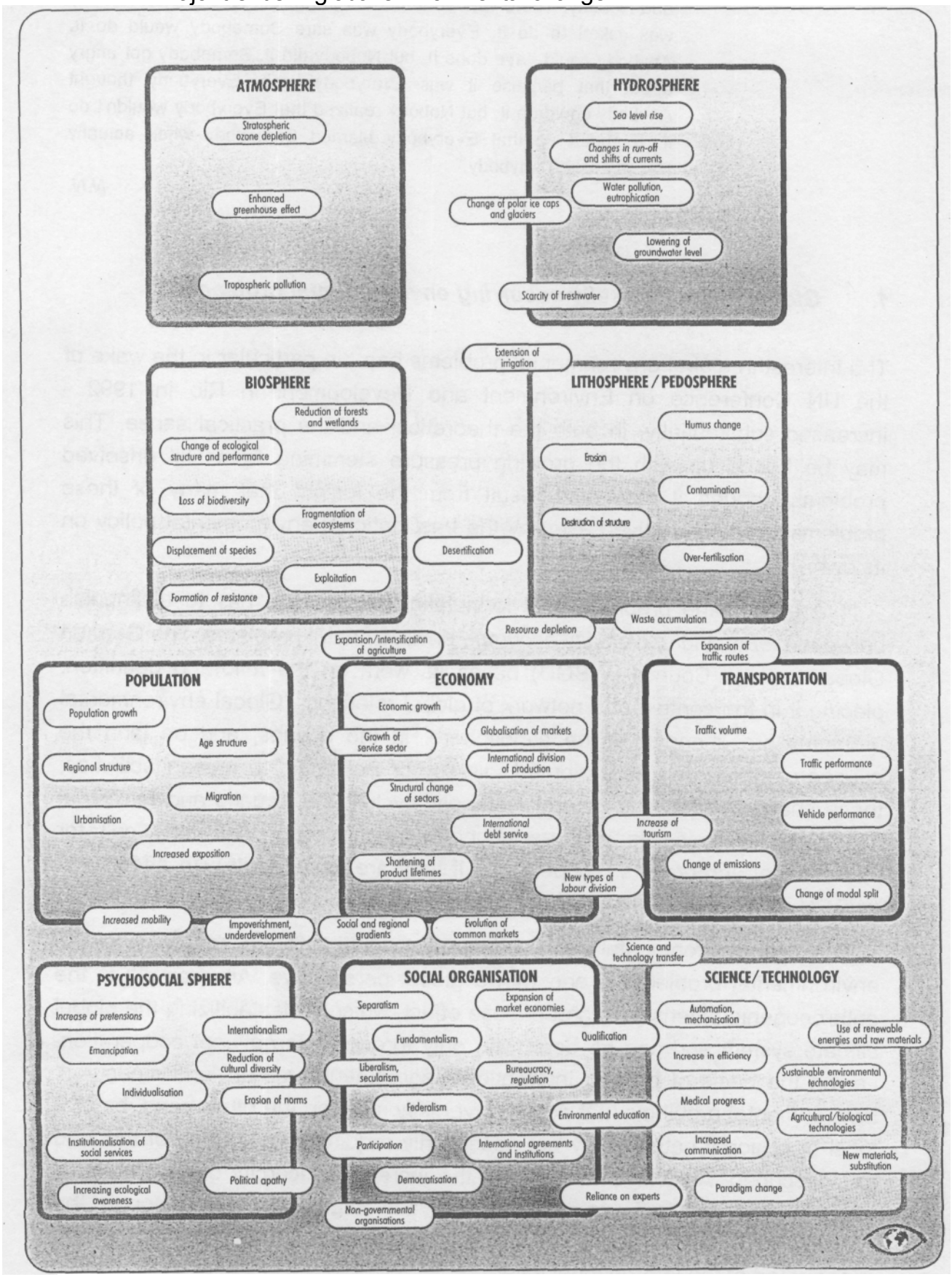
The interest in global environmental problems has - in particular in the wake of the UN Conference on Environment and Development in Rio in 1992 - increased substantially, in both the theoretical and the practical sense. This may be bound up with the growing pressure stemming from still unsolved problems, though it may also result from the insight that many of these problems cannot be solved even by the best national environmental policy on its own.

In analyzing the problems and formulating policy, one has to distinguish between *global* and *universally occurring* environmental problems. The German Global Change Council (WBGU) bases its work on the following definition, placing it in the context of a network of global relations: "Global environmental problems are changes in the atmosphere, in the oceans, and on land the *causes* of which can be attributed, directly or indirectly, to human activities; these changes *affect* the natural metabolic cycles, the aquatic and terrestrial ecological systems, as well as economy and society; and they call for *international agreements* (cooperation) if they are to be dealt with effectively" (WBGU 1993; author's emphasis).

The only environmental policy adequate to deal with the causes of *global* environmental problems is one with a global perspective. An example is the anthropogenic (intensified) greenhouse effect, which is destabilizing the global climate system and can be dealt with only through international cooperation, i.e. on the basis of binding international agreements, targets and measures. Environmental problems that *occur universally* may, on the other hand, be of a local or regional nature; they not necessarily require an approach of the kind just described. An example would be the increasing scarcity of freshwater, a problem that can be addressed locally and regionally, even though the strategy, in view of uneven problem-solving capacities, may need to be one coordinated at the international level.

Figure 1: Global network of interrelations

Major trends in global environmental change



Source: WBGU 1993, p. 189.

The reason for the need for a global perspective and an internationalization of environmental policy is not only growing ecological-economic inter-dependencies, the complexity of physical-chemical cause-and-effect relation-ships, the long-term nature of the effects and the possible irreversibility of ecological damage, it is also and in particular to be sought in the multiplicity of political actors, their conflicting interests, the variability of their economic and technical capacities, and the social organization of technology and science. Global or universally occurring environmental problems call for policies that, while not releasing the nation state from its responsibility as the main actor, go beyond traditional national sovereignty. It is precisely this need that makes an ecologically effective, economically efficient, and socially acceptable solution an enormously difficult proposition. What is called for if free-rider behavior is to be warded off is international cooperation and global diplomacy that provide consensual targets, an adequate set of instruments, and the institutional conditions appropriate to a coordinated implementation of policy. A major problem facing international environmental policy is thus that its goals must be implemented by means of voluntary action and enforced by states whose territorial authority is limited - and that the mechanisms available to induce states to enforce international environmental policy are no more than partial ones.

2. Globalization of the way in which the problem is perceived. A survey

Global or universally occurring environmental problems can be approached in entirely different ways. The literature often refers to the "environment formula" according to which global environmental impacts (I) are caused by world population growth (P), increasing affluence (consumption of goods and services (A), and environmentally unsound technology (T).

$$\mathbf{I = f\ (P, A, T)}$$

This formula has, it is true, had little effect on the formulation of practical policy, even though it does take into account the demographic, economic, and technological forces driving the degradation and destruction of the global environment (such as the ozone layer, climate, biodiversity, soils, water, and oceans). What has happened instead is that a medial structure of international environmental policy has emerged which more or less markedly integrates these driving forces or the intermedial nexus.

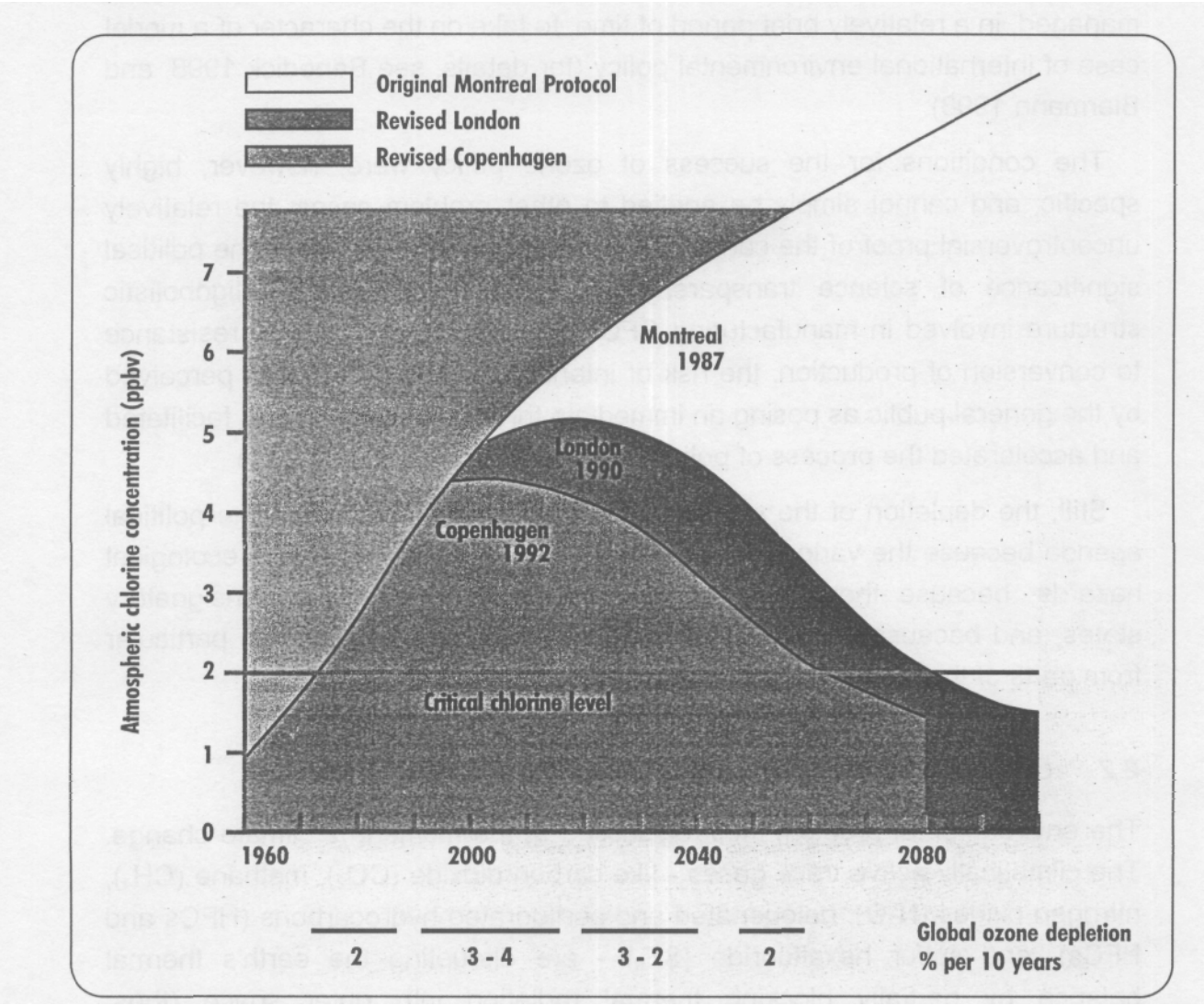
The most important reason for this mode of policy formulation is a historical-pragmatic one: real environmental problems develop at different paces, are perceived by the public, assessed by science, and addressed by the political sphere at different levels of intensity. This was the case as national environmental policy developed, with its policies geared far more to clean air and waste disposal than e.g. to soil protection - and it continues to be the case in international environmental policy, which is far more advanced in formulating ozone and climate policy than e.g. biodiversity policy and soils and water policy.

2.1 Ozone policy

The global environmental problem that has received the most intensive political attention is the degradation Of the stratospheric ozone layer. A total of ten years of negotiations led here to a dynamic international environmental regime based on a legal framework consisting of a stable, institutional component *(Framework Convention)* and a flexible, instrumental component *(Protocol).*

The "Vienna Convention" of 1985 defined the problem, the "Montreal Protocol" of 1987 obliged the signatories to reduce the use of the chlorofluorocarbons (CFCs) and halones that are destroying the ozone layer by 50 percent (reference year: 1986) by the year 1999, though it did permit, for an initial phase, products to be transferred to other countries. The 1989 Helsinki Conference of the Parties initiated the planned revision of the agreement, and provided for a complete production ban on CFCs and a gradual reduction of the other ozone-depleting substances. The follow-up conferences held in London (1990) and Copenhagen (1992) decided on further reductions of the phase-out period.

Figure 2: Ozone depletion rates per decade
Original Montreal Protocol and revisions



Source: *WBGU 1993, p. 23.*

Aside from these stepped-up reduction schedules, however, an expansion of international cooperation also appeared necessary in that it was initially only industrialized countries that had submitted to the rules, and not developing countries like Brazil, China, and India, which have potentially large domestic markets for cars, refrigerators, and air-conditioning systems that operate with conventional CFC technologies. To facilitate an accession of these countries to the Protocol, the signatories decided to develop a mechanism aimed at funding and providing access to modern technology. The 1990 London conference set up the *Multilateral Ozone Fund* which has the task of covering the increased costs *(full incremental costs)* incurred by developing countries in converting

their production to ozone-compatible substances and processes. By phasing out ozone-depleting substances in the industrialized countries and transferring funds and technology to developing countries *(substitution)* the ozone regime managed, in a relatively brief period of time, to take on the character of a model case of international environmental policy (for details, see Benedick 1998, and Biermann 1998).

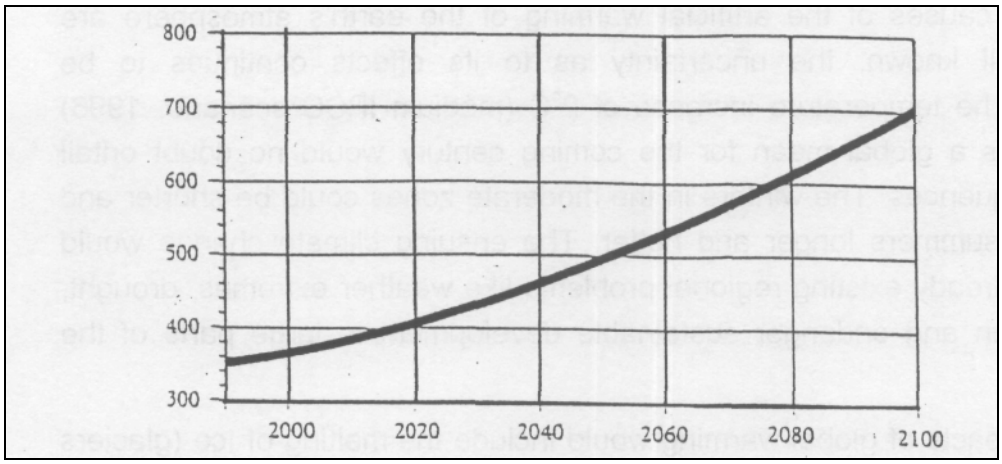
The conditions for the success of ozone policy were, however, highly specific, and cannot simply be applied to other problem cases: the relatively uncontroversial proof of the cause-and-effect nexus involved made the political significance of science transparent, the highly concentrated, oligopolistic structure involved in manufacturing CFCs weakened the industry's resistance to conversion of production, the risk of intensified UV radiation was perceived by the general public as posing an immediate threat. All these factors facilitated and accelerated the process of policy formulation and implementation.

Still, the depletion of the stratospheric ozone layer remains on the political agenda because the various replacement substances likewise pose ecological hazards, because there are implementation problems in the nonsignatory states, and because large-scale illegal imports are taking place (in particular from parts of the former Soviet Union to the USA).

2.2 *Climate policy*

The environmental problem most discussed at the moment is climate change. The climatically active trace gases - like carbon dioxide ($C0_2$), methane (CH_4), nitrogen oxides (N_20), halogenated and perfluorated hydrocarbons (HFCs and PFCs), and sulfur hexafluoride (SF_6) - are disrupting the earth's thermal balance by partially blocking thermal radiation into outer space (thus: *intensified greenhouse effect).* The largest share (more than 50 percent) of this warming process falls to CO_2, which, practically ubiquitous, is a by-product of all economic activities and whose levels correlate highly with gross national product. The $C0_2$ problem is thus a North-South problem, in that per capita emissions differ substantially between industrialized and developing countries (see Figure 7 on this point).

Figure 3: Anticipated increase of $C0_2$ concentration, in ppmv



Source: IPCC 1996, p. 23.

The CH_4 emissions (which account for some 18 percent of the greenhouse effect) on the other hand constitute a South-North problem inasmuch as large quantities of this greenhouse gas originate in agriculture, in rice cultivation, and in the digestion process of cattle herds in the countries of the South. Unlike the CFCs, it is difficult or even impossible to quickly reduce or indeed phase out carbon dioxide and methane emissions, The case may be different with HFC, PFC, and SF_6 emissions, all of which stem from industrial processes for which substitutes can be found.

Figure 4: Causes of the anthropogenic greenhouse effect, shares in %

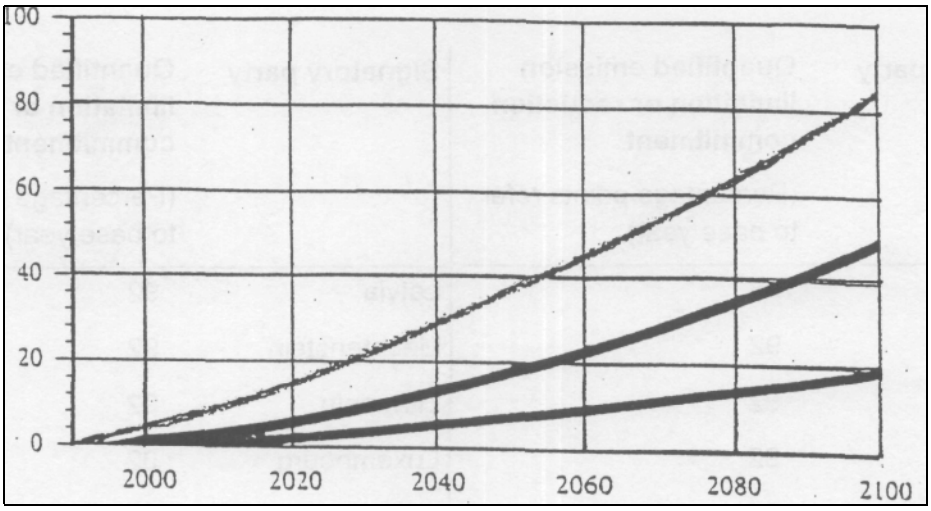
Causes	**Effects**	**Shares** (rounded off)	**Distribution of trace gases (rounded off)**
Energy generation, transportation	combustion of fossil fuels (coal, mineral oil, gas)	50%	40% CO_2 10% $CH_4$and O_3
Chemical industry	emissions of CFCs, halones, etc.	20%	20% CFCs, halones, etc.
Forestry	destruction of forests by burning and decay	15%	10% CO_2 5% other trace gases, mainly N_20, CH_4, and CO
Agriculture	anaerobic conversion (CH_4 through cattle-farming, rice cultivation, etc.) fertilization (N_2O)	15%	15% mainly CH_4, N_2O, and CO_2

Source: *Enquete-Commission 1995, p. 76.*

While the causes of the artificial warming of the earth's atmosphere are relatively well known, the uncertainty as to its effects continues to be substantial. The temperature increase of 2°C (medium IPCC scenario, 1996) anticipated as a global mean for the coming century would no doubt entail grave consequences. The winters in the moderate zones could be shorter and warmer, the summers longer and hotter. The ensuing climate change would exacerbate already existing regional problems like weather extremes, drought, or soil erosion and endanger sustainable development in large parts of the world.

Further impacts of global warming would include the melting of ice (glaciers and pole caps) and the thermal expansion of the ocean waters engendered by it. According to the 1996 IPCC assessment, a temperature rise of 2°C (medium scenario) would raise the level of the oceans by roughly 50 centimeters - or indeed even further should large blocks of polar ice shear off into the sea. Since roughly one third of the world's population lives within a distance of 60 kilometers from the coastline, these people's living and working conditions would be affected, some individual countries (like e.g. Bangladesh) and many island states (like e.g. the Maldives) would be threatened in their very existence.

Figure 5: Sea level rise, 1990-2100, in cm
Low, medium, and high projection



Source: IPCC 1996, p. 384.

The "United Nations Framework Convention on Climate Change" (in what follows: *Climate Convention)* adopted at the UN Conference on Environment and Development in Rio in 1992, which came into effect in March 1994, is, like the ozone regime, dynamic in its conception (annual conferences of the parties, obligation to report regularly, flanking scientific research, secretariat in Bonn) and contains a potentially powerful definition of the conditions of climate stabilization (Article 2).

> "The ultimate objective... is to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level would be achieved within a time-frame sufficient
>
> - 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."
>
> (Author's emphasis)

At the Third Conference of the Parties in Kyoto in 1997 the convention was supplemented by a protocol (the "Kyoto Protocol") containing modest yet concrete stipulations on targets and timetables, some initial measures designed to reduce emissions (sources) or to enhance nature's absorption

capacity *(sinks),* as well as some institutional arrangements for implementing the convention.

Figure 6: "Kyoto Protocol", Annex B

Signatory party	Quantified emission limitation or reduction commitment (Percentage points refer to base year)	Signatory party	Quantified emission limitation or reduction commitment (Percentage points refer to base year)
Australia	108	Latvia	92
Austria	92	Liechtenstein	92
Belgium	92	Lithuania	92
Bulgaria*	92	Luxembourg	92
Canada	94	Monaco	92
Croatia*	95	Netherlands	92
Czech Republic*	92	New Zealand	100
Denmark	92	Norway	101
Estonia*	92	Poland*	94
European Union	92	Portugal	92
Finland	92	Romania*	92
France	92	Russia	100
Germany	92	Slovakia	92
Greece	92	Slovenia	92
Hungary*	94	Spain	92
Iceland	110	Sweden	92
Ireland	92	Switzerland	92
Italy	92	Ukraine*	100
Japan	94	United Kingdom	92
		USA	93

* Countries in transformation to a market economy

Source: Kyoto Protocol, Annex.

The fields of economics and political science have developed several strategic proposals concerning the instruments of future climate policy. These extend from the imposition of national and global resource taxes or emission charges to joint implementation and internationally tradeable emission certificates (see Section 3 for a discussion of this issue). Adoption of these proposals would presuppose and entail drastic changes in the growth path and the structure of the industrialized countries and the developing countries alike *(ecological structural change of the economy).*

Figure 7: $C0_2$ emissions in the industrial sector, 1992, in tons

Ranking		**Total emission**	**Per capita emission**
1	USA	4.881.349	19.13
2	China, PR	2.667.982	2.27
3	CIS	2.103.132	14.11
4	Japan	1.093.470	8.79
5	Germany	868.136	10.96
6	India	769.440	0.88
7	Ukraine	611.342	11.72
8	United Kingdom	566.246	9.78
9	Canada	409.862	14.99
10	Italy	407.701	7.03
11	France	362.076	6.34
12	Poland	341.892	8.90
13	Mexico	332.852	3.77
14	Kasachstan	297.892	17.48
15	South Africa	290.291	7.29
	World	*22.339.408*	*4.10*

Source; *WRI 1996, pp. 328f.*

A number of measures might be considered as means of practically implementing dynamic conceptions of emission reduction and/or absorption; they include above all the

- reduction of the consumption of fossil fuels by enhancing energy efficiency in the fields of transportation energy, electricity, heating energy;
- installation of new, efficient energy generation technologies such as combined heat and power plants (CHP), district heating and air-conditioning, gas turbines;
- substitution of fossil fuels by renewable energies such as biomass, wind energy, photovoltaics, hydrogen; and the
- enlargement of $C0_2$ sinks, in particular by putting an end to the destruction of rain forests and promoting large-scale reforestation programs.

The impending implementation of climate policy thus involves all three central conflict-laden issues of an international policy of sustainable development: (1) the question as to the quantity and quality of further economic growth, (2) the question of the stabilization of the global ecosystem, and (3) the question of social and intergenerational justice.

2.3 *Biodiversity policy*

The "United Nations Convention on Biological Diversity" (in what follows: *Biodiversity Convention),* which was adopted by 154 states during the UN conference in Rio de Janeiro in 1992 and came into effect in December 1993, brings to expression the insight of the international community that we are in need of a far-reaching, paradigmatic change as far as the conservation of nature is concerned. The concept of biological diversity - or biodiversity - embraces all animal and plant species, including microorganisms, the genetic variability within the species, and the earth's ecosystems in which these species live together.

Figure 8: Animal and plant species threatened by extinction worldwide, 1994

Group	Number
All animals	
Mammals	5.366
Birds	533
Reptiles	862
Amphibians	257
Fish	133
Invertebrates	934
	2.647
Plant species	26.106

Source: UNEP 1995, p. 234.

In spite of numerous agreements under international law on the protection and careful utilization of biological diversity, the destruction of natural habitats and the extinction of species associated with it continue unabated. The main reason no doubt is that the approaches to international protection of nature and species hitherto adopted do not go far enough; and the situation is exacerbated by the lack of political will and of financial commitments needed to address it. The Biodiversity Convention raises the claim to change this situation.

This claim finds expression in the convention's preamble. It declares the protection of biological diversity to be a "common concern of humankind." Article 1 then states:

> "The objectives of this Convention ... are
>
> - the conservation of biological diversity,
> - the sustainable use of its components and
> - the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including
>
> *appropriate access to genetic resources,*
> *appropriate transfer of relevant technologies,* taking into account all rights over these resources and technologies, and
> *appropriate funding."*
>
> (Author's emphasis)

These goals of the Biodiversity Convention constitute a "triad" which is also expected to be reflected in its implementation. Linking conservation issues with

issues of economic and technological policy has thus produced a complex set of rules defining the general framework for future action.

Aside from the articles governing the protection and sustainable utilization of biological diversity and the transfer of financial resources and technology (Articles 1-22), the second part of the convention (Articles 23-42) covers innovative institutional mechanisms concerning the cooperation process and the further development of the treaty itself. It provides for regular conferences of the parties at reasonable intervals at which the negotiations on individual areas of the convention are to be continued and the implementation of its terms verified. Prior to each conference of the parties, a subsidiary board on scientific and technological issues (the so-called SBTTA) has to work out recommendations to be voted on. A permanent secretariat has been set up in Montreal to supervise and administer the convention.

Thanks to its dynamic conceptualization, the Biodiversity Convention is fundamentally capable of addressing new issues and pursuing contentious points on which no agreement had been reached when the accord was signed. One particularly important point here is - not unlike the case of the Climate Convention - the possibility of adopting implementation protocols geared to specifying targets, time-tables, and measures on individual issues.

It was agreed at the Second Conference of the Parties in Jakarta in 1995 to initiate a dialogue with the three thematically related older conservation treaties, the Washington Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Bonn Convention on the Protection of Migratory Species of Wild Animals (CMS), and the Convention on Wetlands of International Importance (Ramsar).

As far as further steps toward implementing the Biodiversity Convention are concerned, an international working group was appointed to negotiate a protocol on biological safety *(Biosafety Protocol),* the task of which is to set out rules for safely handing and for transporting genetically modified organisms. This protocol is set to be adopted at the Third Conference of the Parties in Bratislava in 1998. A panel of experts was set up on the biodiversity of the seas and coastal areas; it is expected to advance proposals on this specific complex of issues soon.

The trade-related dimension of the Biodiversity Convention makes it necessary also to enter into a dialogue with the World Trade Organization (WTO). This dialogue would address, among other things, the agreement on trade-related intellectual property rights (the so-called *TRIPS).*

Figure 9: Deforestation in the tropics, 1980-1995

Annual change to the natural forest stock in millions of hectares and in %

	Stock 1995	1980-90	1990-95	1990-95 (in %)
Developing countries, total	1.871	-15.5	-13.7	-0.7
Africa	508	4.3	- 3.8	-0.7
Latin America	942	- 6.8	- 5.8	-0.6
Asia and Oceania	421	- 4.4	- 4.2	-0.9

Source: FAO 1997, pp. 18 and 182f.

Another complex task facing biodiversity policy is the protection and management of the forests. The global dimensions of forest destruction call for swift, immediately effective protective measures. The present mode of forest management must be replaced by ecologically sustainable forms of utilization. In the *industrialized countries* the existing forests must be protected against any further degradation, and reforestation must be enhanced. In the *developing countries* the key task will be to bring forest protection into line with economic development. An important point here would be to create sources of income stemming from the sustainable utilization of forests. The *Forest Declaration* of 1992, which is legally nonbinding, centers on such economic interests. Besides, the efforts continue to find an internationally binding arrangement for the protection of forests, either through the formulation of an independent *Forest Convention,* or by means of a *Forest Protocol* within the framework of the Biodiversity Convention.

The negotiations on this subtopic of biological diversity are taking place in the Intergovernmental Panel on Forests (IPF) which is expected to present its proposals for future institutional arrangements of an international forest policy in 1998. Since it is forests - in particular the remaining natural forests - that provide a habitat for most of the terrestrial animal and plant species, protection of overall biological diversity depends essentially on utilizing the forests in an ecologically sustainable manner. But since large-scale reforestation can also be used to mitigate the greenhouse problem, an active forest policy would be best climate policy.

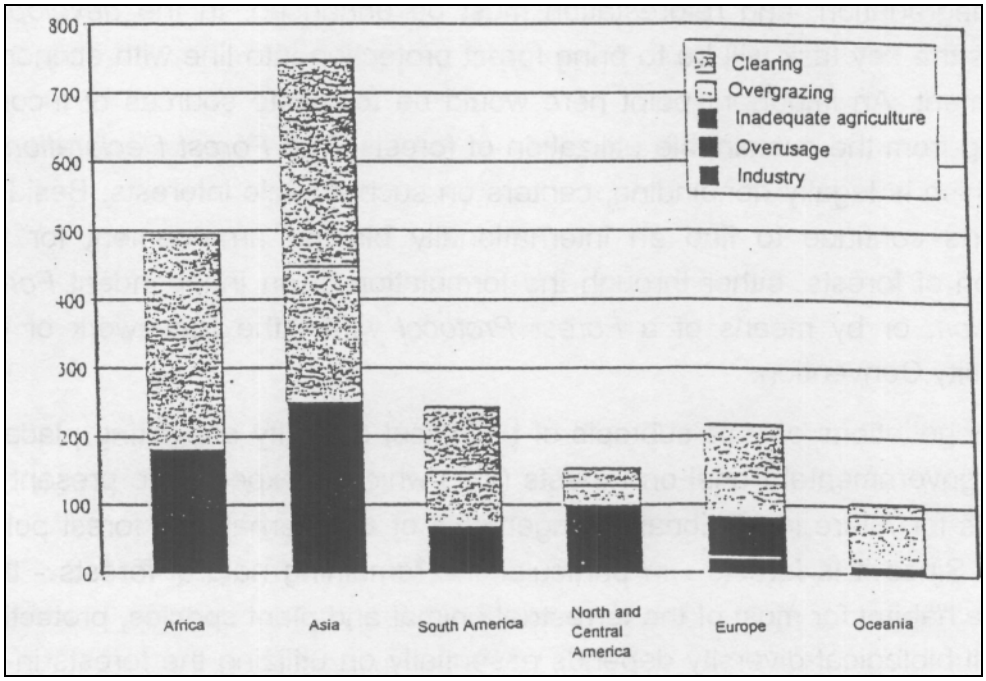
One weakness of the new biodiversity policy can be discerned in the low level of funding provided, measured in terms of the actual need for action. The

Global Environment Facility (GEF), the provisional funding mechanism of the Biodiversity Convention, is also, it should be noted, responsible for implementing projects aimed at protecting the ozone layer, climate, the oceans, and taking action against desertification. A grand total of 800 million US-$ was available to conserve biological diversity in the period between 1995 and 1997. In view of a funding requirement estimated by UNEP to be higher by a multiple factor, these commitments are testimony to a continuing lack of willingness on the part of the states to place the Biodiversity Convention on a secure financial footing of its own.

2.4 *Soil and water problems*

Aside from the quantitative loss of soils due to the sealing of land surfaces, the world is experiencing a tremendous qualitative deterioration of formerly productive soils. It is difficult, however, to determine whether this is a global environmental problem or (merely) one that occurs universally.

Figure 10: Causes of soil degradation, in million of hectares



Source: UNEP/ISRIC 1991, p. 33.

According to recent estimates the world's desert areas are expanding by roughly six million hectares per year. Up to two fifths of Africa's nondesert areas, as well as two thirds in Asia and one fifth in Latin America, could fall

victim to desertification in the future. The growth of population, but also of cattle stocks, in these regions has impaired vegetation, thus accelerating soil erosion.

Figure 11: Causes of desertification in northern China
In percent of total area affected by desertification

Group	Number
Human activities	94.5
agricultural overutilization	25.4
overgrazing	28.3
removal of firewood	31.8
nonadapted water use	8.3
technical factors	0.7
Natural causes	
advance of dunes	5.5

Source: Zhu/Wang 1993, p. 1.

Scientific research on these processes has shown that, compared with natural factors, economic, political, and social factors are far more important than was formerly assumed (see the example of China in Fig. 11). This is why what is called for is not only technical measures but also social and institutional innovations, and above all the introduction of appropriate land use rights. These issues are to be addressed by the "United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought, Particularly in Africa" (in what follows: *Desertification Convention)* that was convened on the initiative of African countries and signed in July 1994 (with its permanent secretariat in Bonn).

This convention is not yet the legal foundation for a global soils policy, especially because the urgency of this problem is perceived quite differently in different quarters. It does, however, call for just as the Climate and Biodiversity Conventions do - international cooperation and is thus a potential predecessor of a global soils policy.

The situation as regards a future global water policy is not quite so promising. The most recent UNEP report on this problematique indicates that 1.2 billion people already lack sufficient and safe water; but water scarcity in

the next decades threatens a total of roughly 80 states in which 40 percent of the World's population lives (UNEP 1996). In many cases water supply is reaching critical proportions due to drought, overutilization of water resources, and deforestation, while the demand for water continues to rise, owing to irrigation in agriculture, increasing urbanization and industrialization, and higher per capita water consumption associated with these developments.

Figure 12: Water supply of selected countries in m^3 per capita, 1992 and 2010

Countries as per region	1992	2010	Changes in %
Africa			
Egypt	30	20	-33
Algeria	730	500	-32
Kenya	560	330	-41
Libya	160	100	-38
Morocco	1.150	830	-28
Mauritania	190	110	-42
Niger	1.690	930	-45
Rwanda	820	440	-46
Somalia	1.390	830	-40
Sudan	1.130	710	-37
South Africa	1.200	760	-37
Tunisia	450	330	-27
Middle East			
Israel	330	250	-24
Jordan	190	110	-42
Lebanon	1.140	980	-30
Saudi Arabia	140	70	-30
Syria	550	300	-45
Others			
Netherlands	660	600	-45
Singapore	210	190	-9
Hungary	580	570	-2

Source: Own compilation of UN data.

Water quality is also deteriorating in many parts of the world, in some cases dramatically. Surface water and groundwater are being polluted by nitrates and pesticides from agriculture, by leaks from municipal and industrial water and waste-water systems, from sewage treatment plants and refuse dumps. The critical standards for drinking water quality recommended by the World Health

Organization (WHO) are thus more and more often exceeded. The respective standards set by the EU Commission are not complied with by thousands of wells in Europe - which consequently should be closed down.

Figure 13: Forms and causes of water pollution

Form of pollution	Cause	Regions heavily affected
Pathogens	Household sewage	Developing countries
Accumulation of nutrients	Mineral fertilizers, household sewage	Industrial countries, countries in transformation, and some developing countries (e.g. Brazil, China; Mexico, Philippines)
Nitrate accumulation in groundwater	Mineral fertilizers	Europe, North America
Salinization of groundwater and surface water	Artificial irrigation, overutiiization of groundwater	Arid zones of Africa, the Middle East, Asia, and Australia
Acidification	Emissions of air pollutants (sulfur dioxide and nitrogen oxides	Europe, North America; regions in Asia and South America in the process of rapid industrialization
Sedimentation	Erosion	China, India, Indonesia, Iran, Iraq
Pollution by heavy metals	Industrial waste water, mining	Industrial countries, countries in transformation, and developing countries (e.g. Brazil, Chile, Mexico, Panama, Philippines)

Source: German Ministry for Economic Cooperation and Development (BMZ) 1995, pp. 29f.

Water policy has a further international dimension in the sense that there are over 200 transnational river catchment areas in the world and a great number of lakes and other bodies of water with regional catchment areas for which viable agreements must be reached among the riparian states.

Beside the call for measures suited to securing, in qualitative and quantitative terms, the water supplies needed for a growing world population - particularly developing new sources, establishing integrated water cycles, and preventing water pollution - in the future reducing water consumption will be of utmost importance not only in agriculture and industry but also in private households *(demand-side management).* The undesirable alternative would be further water rationing and water pollution - with all of the consequences this entails. There is thus an urgent need for political action on an efficient *water price policy,* a *redefinition of water utilization rights,* and the *transfer and installation of water-saving technologies.* The initiative required should be developed through an internationally coordinated water strategy and could, in the not too distant future, lead up to the formulation of a global "Water Convention."

2.5 The waste problem

Many industrial products and chemical wastes are either nondegradable or difficult to store, and the transportation of hazardous wastes is regarded as difficult to control. Once it has crossed an international border, waste is subject to different, sometimes contradictory regulations. The export possibilities that continue to exist diminish the overly weak economic incentives to avoid generating waste at home; and this at the same time implies transferring part of the risk without transferring the technology needed to deal with it.

In view of this problematique, the "Basle Convention on the Control of Transboundary Movement of Hazardous Wastes" (1989) constituted a step in the right direction. But the problem lies in the practical implementation of this convention at the local and national level. It would in particular be important to come up with new technical and institutional arrangements to diminish the latent willingness to circumvent transportation controls and to ensure that waste materials continue to be treated in a manner free of risk for both man and the environment.

Transboundary transportation of hazardous waste, and the treatment of such waste, will, it seems, continue to pose an unsolved problem for the future, one that calls for, and at the same time favors, an internationalization of policy.

2.6 *To sum up*

As the discussions in the previous sections have shown, internationalization has progressed differently in the various medial segments of environmental

policy - the institutionalization of "global environmental policy" is as yet fragmentary (in detail Simonis 1996). While internationalization was from the very beginning immanent to ozone policy, it is also acknowledged in climate and biodiversity policy, though implementation continues to fall short of the mark. Soils and water policies are in an early phase of internationalization, while waste policy is and remains international in the sense and to the extent that local and national strategies devised to minimize hazardous wastes are ineffectual, i.e. the internationalization of the problem is not seen as a solution but as a way out.

3. Instruments of international environmental policy. The future

In formulating the most recent international environmental conventions, three themes played a major role: *efficiency, equity,* and *uncertainty.* And as regards the implementation of such framework conventions by means of protocols, attention has, apart from legal provisions and sanctions, focused on three economic instruments: imposition of international taxes or charges, joint implementation, and internationally tradeable emission certificates.

3.*1 International emission taxes and charges*

The most important argument in favor of an international emission tax or charge is the reduction of pollutant emissions at the lowest possible costs. A tax or charge of this sort would induce rationally acting emitters with low marginal avoidance costs to reduce their emissions, while those with high marginal avoidance costs would find it more appropriate to pay the tax. Put in general terms: taxes and charges make use of the market mechanism to achieve an optimal adjustment to the given environmental problem, while direct governmental regulation can, in the individual case, be extremely expensive. (Tietenberg [1990] noted in a comparative study on the USA that the cost ratio of government regulation to environmental taxes in average is 4:1.)

The most important argument that can be advanced against the imposition of an international tax is not economic but organizational: the tax volume needed to initiate an appreciable reduction of global emissions would be so huge (with reference to climate change, estimates ranging up to several hundred billion US-$) that a centralized administration of the funds would not be acceptable, while a decentral allocation of the funds would be very difficult to manage.

There is, however, also an ecological argument that can be advanced against any such international tax: in cases involving rapidly increasing marginal damage (like, for instance, the ozone hole or the loss of species) taxes or charges stand for an economic compromise that is no longer suitable to the ecological system in question. Here the only sensible solution is to set quantitative limits.

While efficiency and equity are centra! criteria of the conventions on climate, biodiversity, and law of the seas, these agreements contain, surprisingly, no concrete statements on the introduction of an international tax or charge. The case is different with the two other instruments, which are either in place or in preparation.

3.2 *"Joint implementation"*

As regards the choice and formulation of the instruments of international environmental policy, the passages most relevant here are Article 3, Paragraph 3 of the Climate Convention, which calls on the signatories to implement the relevant measures cost-effectively. This efficiency clause is of particular significance in view of the ecological and economic framework conditions of any international environmental policy: when dealing with emissions with global impacts (for instance: carbon dioxide emissions) it makes no difference whatever where in the world these emissions are reduced; if, however, their costs are to be minimized, we must face the fact of the marginal costs of emission reduction, which are highly variable internationally; i.e. we must observe the economic argument. It is against this background that the instrument of "joint implementation" found its way into the Climate Convention (in particular Article 4, Paragraph 2a, 2b). The First Conference of the Parties to the Convention in Berlin in 1995 (the "Berlin Mandate") decided on a trial pilot phase, and this commitment was confirmed at the Third Conference of the Parties in Kyoto in 1997 (the "Kyoto Protocol").

"Joint implementation" may be understood as the stage preliminary to a quantity-related policy with tradeable emission certificates: a country (a branch of industry, a firm, a community) can achieve its reduction commitments through a combination of national (internal) and international (external) reductions. Whereas this instrument was previously interpreted as meaning that an Annex-I party to the Climate Convention (i.e. industrial countries and countries in transformation) can meet its emission target under the treaty not only by means of quantitative reductions at home but also by investing in mitigation activities in another Annex-I country, the "Berlin Mandate" envisages

an enlargement according to which - on a voluntary basis - non-Annex-I states (i.e. developing countries) can also be involved in the procedure. This makes "joint implementation" a potentially important instrument in the North-South context. Joint implementation can thus be seen as a first step toward an international environmental policy aimed at controlling the quantities of emissions. How meaningful this instrument is or can be will, however, depends on a number of conditions still in need of clarification (see Jepma 1995).

At the conference in Berlin in 1995, Germany reaffirmed its declared commitment, indeed even going a step further: "...to reduce, by the year 2005, its CO_2 emissions by 25% as compared with 1990 levels" (speech of the German chancellor, April 5, 1995). Meanwhile, however, it has become evident that Germany will be unable to keep this pledge domestically. This problem could, however, easily be solved in the context of a joint implementation program involving eastern and southern Europe and the developing countries. It would thus make sense to fine-tune the instrument of "joint implementation," preferably in coordination with the members states of the European Union, particularly because in this way it would be possible to activate substantial private means for global climate protection.

3.3 *Internationally tradable emission certificates*

The current negotiations on the climate and biodiversity conventions must come up with binding global emission commitments. As far as the climate problematique is concerned, the Intergovernmental Panel on Climate Change (IPPC) is proceeding on the assumption that if the goal of the Climate Convention (Article 2) is to be achieved by the year 2050, global $C0_2$ emissions will have to be reduced by roughly 50% with reference to 1987 levels, which means reductions of 80% in the industrialized countries. An initial (albeit modest) stipulation of concrete goals of climate policy was reached at the Third Conference of the Parties in Kyoto in 1997. The task now is to select the instruments best suited to reach the targets set - and thus best suited to giving shape to a system of internationally tradable emission certificates.

A next step here would be to issue to the parties to the convention tradable certificates (licenses) equivalent to the total volume of permissible global emissions agreed upon on the basis of an allocation procedure yet to be arranged. If the initial allocation on this basis were insufficient to a participant's needs, this party (country, branch of industry, firm, a community) would have to acquire additional certificates in the market. For the participants in the system, this would mean a general incentive to lower emissions, i.e. either to minimize

the costs of purchasing additional certificates or to maximize the proceeds from the sale or lease of surplus certificates. If the initial allocation to developing countries leads to a surplus of certificates there (which is to be expected in view of their low per capita emissions), what emerges is a powerful mechanism for a net transfer of resources from North to South: The developing countries could sell or lease their surplus certificates to industrialized countries, for financial resources or for technologies. This would give rise to a market, where thus far none exists.

The essential difference between a certificate system and an international tax or charge arrangement is that emission certificates would exactly hit the emission reduction mark. The financial costs would follow from the actual costs needed to reach this target. This contrasts with an emission tax that would regulate financial costs, but not the volume of emissions itself. A further difference would be that a tax arrangement would necessarily entail monetary transfers, whereas certificates could also be traded against nonmonetary gratuities (for instance, against patents). In general, a system of tradable emission certificates would widen the options for negotiations between North and South - and might, just for that reason, meet with widespread political approval.

3.4 The next steps

An agreement on the instruments of international environmental policy will have to satisfy several criteria, in particular those of equity, efficiency, and decision-making under uncertainty. Depending on the way in which these criteria are weighted, the political recommendation will sway toward one or the other of these instruments, or toward a certain combination of them.

In view of the constitution of the international political system and the structure and mode of operation of global environmental regimes, there is much that speaks in favor of *market-based quantitative arrangements,* in particular "joint implementation" in the initial phase and tradable emission certificates in the culminating phase of such a regime. This is, however, not to rule out regulative and tax-based arrangements, and not only because the implementation of these economic instruments also poses certain monitoring and verification problems. If, in particular, fund arrangements like the Global Environment Facility (GEF) are to be further developed, this would require a certain measure of tax-based funding, because otherwise the autonomy of conventional multilateral development assistance would be negatively affected. This then would (re)direct our attention to other taxes and bases for

assessment that were proposed long ago, like for instance taxes on arms exports (Brandt Report 1983), long-distance tourism (Mishan 1970), international trade (Brundtland Report 1987), or international financial transactions (Quereshi / v. Weizsäcker Report 1995).

4. Institutionalization of international environmental policy. The future

What is meant by *institutions* are permanent, interlinked rules and procedures that stipulate behavior, limit activities, and shape expectations (Haas/Keohane/Levy 1993, pp. 4-5.). They may take the form of bureaucratic *organizations, general rule mechanisms* (that do not necessarily have an organizational underpinning), or *negotiated conventions.* Institutions of international environmental policy mainly have, alone on account of the lack of hierarchical agencies of governance *("world government"),* the form of horizontal self coordination on the level of nation states, and these institutions may operate both with instruments of direct regulation (type a) and by means of indirect regulation (type b) (more on this point below).

A global view of the environmental problematique arose at the beginning of the 1970s. And thus it was that the first reports of the Club of Rome (in particular the study by Meadows et al.) were geared throughout to the "One World" model. "In Defense of Earth" was the title of a book published by Lynton K. Caldwell that, as early as 1972, called for a global institutionalization of environmental protection. For practical environmental policy, however, this initial global orientation of the scholarly discussion on the environment was of limited import. The period did, it is true, see the signing of a number of international environmental agreements, in particular on the protection of endangered species and the world's seas; the year 1973 also witnessed the inauguration of the United Nations Environment Program (UNEP), and other international organizations presented environmental protection concepts of their own. Yet practical environmental protection continued to by marked largely by its restriction to national or border-related environmental problems (to wit: numerous OECD reports from the 1970s).

It way only in the mid-1980s that a renewed internationalization began to take place. The striking signposts of this phase of environmental policy included the formulation of the "Montreal Protocol on the Protection of the Ozone Layer" (1987), the report of the World Commission on Environment and

Development • *"Our Common Future"* (1987), and the resumption of the discussion over the necessity of global climate protection. The first culminating point was the UN conference in Rio de Janeiro in 1992 (the so-called Earth Summit), the course of which saw the signing of the framework conventions on climate and biodiversity, the Rio Declaration, the principles on forests, and AGENDA 21.

Figure 14: Steps on the way toward a global environmental policy

- UN Conference on Environment and Development, Stockholm 1972
- Marpol agreements, 1973, 1978 (1983)
  (Prevention of pollution of the seas)
- UN Law of the Seas Conference, 1973-1982 (1994)
- Vienna Convention of the Protection on the Ozone Layer, 1985, with Montreal Protocol, 1987

  and the subsequent tightening-up of its provisions:
  - London, 1990
  - Copenhagen, 1992
- UN Conference on Environment and Development, Rio de Janeiro 1992
  with two *global conventions:*
  - *Climate Convention,* 1992 (1994)
  - *Biodiversity Convention,* 1992 (1993)

  as well as AGENDA 21 (1992)

Source: Own compilation.

As far as possible innovative approaches to environmental policy are concerned, the given framework conditions of international politics restrict any such approaches in a number of ways: in accordance with the fundamental principle of national sovereignty, environmental policy is, in the individual case, bound to the assent of representatives of nation states. The international decision-making process accordingly avails itself of the means of negotiations. Without the "shadow of hierarchy" (F.W. Scharpf) working in favor of decisions on *national* environmental policy, *international* environmental policy has to rely on voluntary consent for developing problem-related rules and mechanisms. For international environmental policy, therefore, the most important lever is to have or to gain influence on national processes of decision-making. On the

other hand, there is much evidence indicating that international agreements on certain standards can influence the strength of positions in national discussions on ecological interests.

The interrelationships between individual problem areas also give rise to a particular need *for functional coordination.* Thus, for instance, the supply-oriented policies of multilateral development banks in the energy or transportation sector tend to counteract the efforts of an effective, demand-oriented climate policy. The need for coordination has increased also as a consequence of the sheer number of international environmental agreements.

Various institutional innovations have been introduced in connection with the ongoing internationalization of environmental policy since the mid-1980s. They concern, on the one hand, in the sense of *direct regulation,* the setup of institutions for an organized transfer of funds and technology, and on the other hand, in the sense of *indirect regulation,* changes in the control of procedural, resource-related, and organizational matters.

4.1 Transfer of financial resources and technology

Various funds have been set up for the purpose of transferring financial resources and technology, intended to provide the developing countries with incentives to assume and fulfill international environmental commitments. Article 4, Paragraph 4 of the Montreal Protocol and Article 4, Paragraph 7 of the Climate Convention, for instance, link, in an explicit and legally binding manner, the environmental obligations of the developing countries to transfers on the part of the industrialized countries: if the latter fail to pay, the former are free of their obligations.

These agreements at the same time stand for two different approaches to the transfers to be made. The Multilateral Ozone Fund set up in 1990 in connection with the Montreal Protocol is conceived only for transfers aimed at protecting the stratospheric ozone layer; it is thus an *issue-specific* form of the organization of compensation payments. The Global Environment Facility (GEF), likewise set up in 1990, and substantially reformed in 1994, is instead a central *cross-sectoral* institution responsible for transfer payments in the field of global environmental protection, particularly for measures to protect the ozone layer, climate, international waters, and biological diversity.

Targeted economic incentives aimed at implementing environmental policy measures have not only been organized via such funds. Since the second half of the 1980s, "debt-for-nature swaps" have become increasingly important as a

means of funding environmental protection projects in developing countries. Since 1987 more than 20 such projects with an overall volume of far over 100 million US-$ have been realized in this way (UN 1994, p. 21.).

We here see at the same time the increasing importance and beneficial effects of *nongovernmental organizations* (NGOs) for international environmental policy. It is in particular environmental groups and municipalities that play a major role in decision-making and implementation of measures (e.g. the Climate Alliance of numerous German towns and cities). In acknowledgment of this development neither the formulation nor the implementation of international environmental policy may be seen any longer as domains of purely intergovernmental policy. Accordingly, Chapters 27 and 38 of AGENDA 21 set the goal of involving environmental groups, industrial organizations, and municipalities in all phases of the formulation and implementation of policy.

4.2 The control of processes, resources, and organization

Moreover, a change in the traditional direct governance regulation in international environmental policy in underway. In view of the concept of *sustainable development,* new forms of indirect governance are being addressed. *Capacity-building* plays a central role here. What this means is above all the development of personnel capacities and administrative structures in the developing countries; in more general terms it means the expansion of a country's "personnel, scientific, technological, organizational, and financial potential" - which thus includes industrial countries as well.

The processes of decision-making, balancing of interests, and implementation of action programs have also seen the advent of institutional innovations in recent years. In particular, a *functional differentiation of communication* has taken place. Increasingly not only scientific issues but technical-economic and financial questions are deliberated in committees, separate from the actual political negotiation process, in this way relieving the process of political negotiation of some of its workload and clarifying the politically uncontroversial issues at a more rapid pace.

As far as the processes of decision-making and implementation are concerned, one important innovation was the introduction of *majority decisions binding on all parties.* Within the Montreal Protocol, for instance, a decision was made to tighten up the control over the regulated substances: a decision taken with a two-thirds majority is directly *binding on all parties* without any need for national ratification. Within the GEF, a *doubly weighted majority* was

introduced: in this case a decision of the Executive Committee, which is made up equally of representatives from developing and industrial countries, can be reached with a 60% majority of the votes cast, providing that this majority also represents 60% of the funding contributions. This concedes a de facto veto position for both the main donor countries and the developing countries as a whole, while individual countries are unable to block collective decisions (WBGU 1994, pp. 25-26).

Beyond this process of official international institution-building, the Rio follow-up process has seen the emergence of a number of other innovations in the nongovernmental sphere, for instance, the establishment of the *Business Council for Sustainable Development* made up of entrepreneurs committed to environmental protection, the foundation of the *Planet Earth Council* consisting of ecologically sensitive personalities, the *European Business Council for a Sustainable Energy Future* made up of representatives of firms that are committed to promoting renewable energy.

Apart from these practical innovative successes, the current discussion has also witnessed various proposals for more thorough reforms, to be discussed in what follows.

4.3 Fundamental institutional reorganization

In the immediate follow-up to the 1992 UN conference in Rio de Janeiro proposals on a fundamental reorganization of the international institutional system were high on the agenda. One consideration advanced was to give the United Nations Environment Program (UNEP) the status of a *special organization,* or to amalgamate the environment program and the United Nations Development Program (UNDP) to form such a special organization (UN 1991). There was also a call to set up a *Global Environment Council* that would be endowed with a weight comparable to that wielded by the UN Security Council.

A similar proposal concerned the establishment of a *Global Environmental Organization* (GEO) which - on the model of the GATT as the most important institution regulating world trade - would serve as a forum for formulating and implementing global environmental policy (Esty 1994); GEO would not only include the existing issue-specific international environmental agreements, it would also become the central institution concerned with financial and technology transfer aimed at supporting sustainable development in the developing world.

Sustainable development is per se an intergenerational undertaking. Against this background, the ongoing ecological discourse has developed or reactivated a number of concrete proposals: an "intergenerational ecological pact" (Brown-Weiss 1993), a "planetary legacy" and "common patrimony" (Brown-Weiss 1989), the "ecological rights of future generations" (Cousteau Society 1991), a "second chamber besides parliament" (von Hayek 1969), a "chamber of generations" (von Lersner 1994) are concepts, which, as unlike as they are, do share one common concern: that, in view of the present levels of resource consumption and environmental degradation, there is an urgent need for institutional arrangements to address and guarantee intergenerational equity.

But there is still a pressing need for research and action to define and stipulate such rights and obligations toward future generations. The general political lesson that should be inferred would be to examine *each and every* policy in terms of whether or not it is in conformity with the principle of intergenerational equity.

4.4 Changing institutions

As far as the communication and decision-making processes at the international level are concerned, complaints are often heard that the predominant *consensus procedure* is unwieldy. By contrast, the positive effects of *majority decisions* of the type that recently became possible in the framework of the GEF have been referred to. The possibility of applying the model of the Montreal Protocol to other areas of global environmental policy has also been addressed. With an eye to facilitating and accelerating international decisions, emphasis should furthermore be given to the importance of consensus-promoting argumentational processes *("policy dialogue"),* permitting joint learning and a joint search on the part of the cooperation partners for solutions to common problems.

One cross-sectoral dimension of institutional innovation - above and beyond the proposals outlined above - is the integration of the concept of sustainable development into the activities of all international organizations. One priority of the pertinent discussion is the call for an *ecological reform* of the GATT treaty and the World Trade Organization (WTO). One issue - but by no means the only one - here is the danger that more strict environmental standards in one country could be counteracted by relocating "dirty" industries in countries with less stringent standards and then reimporting the products (so-called *environmental dumping).* The proposals for reforming the GATT (the WTO)

accordingly center on the inclusion of certain principles that facilitate the establishment of minimum ecological standards for products traded internationally (in detail, Helm 1995).

Another problem associated with adequate consideration of global environmental issues concerns the way in which *multilateral and bilateral development assistance* operates. Project aid of multilateral development banks, for instance, can run counter to the goals of global environmental protection, thus hobbling the implementation of international environmental agreements. Environmental organizations have accordingly proposed that the executive organs of the climate, biodiversity, and desertification conventions should set targets governing the way that bilateral and multilateral development assistance organizations deploy their funds.

A potentially important proposal for a change to the international institutional system was made by the Worldwatch Institute in its "State of the World Report 1997": to replace the economically motivated Group of Seven, G7, with a Group of Eight, E8, founded on environmental and development-related principles - the *"eight environmental heavyweights."* These would be four industrialized countries and four developing countries which together account for 56 percent of the world population, generate 59 percent of world production, and possess 53 percent of the world's forested areas.

Figure 15: The "eight environmental heavyweights"

Country	Share of world population 1996	Share of gross world product 1994	Share of world C-emissions 1995	Share of global forests 1990	Share of flowering plant species 1990[1]
USA	5	26	23	6	8
Russia	3	2	7	21	9
Japan	2	17	5	0.7	2
Germany	1	8	4	0.3	1
China	21	2	13	4	12
India	17	1	4	2	6
Indonesia	4	0.7	1	3	8
Brazil	3	2	1	16	22
E8, total	56	59	58	53	-

Based on a total of 250 000 known species. Due to an overlapping of species in individual countries is was not possible to calculate the total percentage.

Source: WorldWatch Institute Report 1997, p. 8.

The E8 group - it is to be expected - would have far more influence in shaping the future of our planet than the G7 countries do now. Though the political systems of the eight states are highly different, as far as their influence on the stocks of global resources and global environmental damage is concerned, they are singular - eight environmental heavyweights, so to speak. It is, noted Worldwatch, time for the E8 to take on more responsibility for the enforcement of existing environmental agreements and the formulation of new ones, for them to become the catalyst of action: "A key challenge will be to focus on the common interests of all countries rather than on national interests; in the struggle for a sustainable world, the fates of rich and poor, of North and South are inextricably linked." (Worldwatch Institute Report 1997, p. 10)

4.5 Enlarging institutions

It has been suggested that the experience gained in the International Labor Organization's (ILO) audit of the performance of national behavior (i.e. social

standards) might be applied to environmental issues (i.e. environmental standards). In recent years, the practice of issuing *ecological audits,* borrowed from the field of business management, has caught on in Germany and many other countries at a surprisingly rapid pace.

The European Union's Regulation (EEC) No. 1836/93 of June 29, 1993, (eco-audit or EMAS regulation) created a single framework for company-level environmental management and the evaluation of environmentally relevant performance and impacts. It would be possible to ground an audit of *environmental policy, programs, and management on* principles similar to those used for company audits. A preliminary phase of this proposal can be seen in the reports of the OECD on the environmental policies of its members, which have, since the beginning of the 1990s, been prepared in keeping with a uniform framework (e.g. OECD, Germany, 1993). The *transparency of actor behavior* could in this way be addressed at the international level as well. Since there is no legitimated policy agency at this level equipped to enforce compliance with obligations, the task would be to ensure that noncompliant behavior is perceived by a broad international public.

The proposal to set up an *international environmental court* involves enlarging the existing institutional system in another way. An international court could serve to improve the manner in which conflicts over environmental issues are settled; at the same time, this would mean creating an additional instrument to sanction those who damage the environment. Unlike the ecological audit, which operates on incentives to stimulate environmentally friendly behavior, the effects anticipated here would stem from intensifying the disincentives against environmentally harmful behavior.

In addition to the above-outlined proposals additional possibilities exist to render international negotiations on environmental issues more flexible:

- The growing economic-ecological interdependencies make *compensation- or package-based solutions* possible. As in the case of the *"debt-for-sustainable-development swaps"* approaches might then be realized within a larger frame of reference.
- The ongoing differentiation of *environment-related discourses* make the negotiation processes more flexible, since distributional conflicts would lose some of their significance. It is thus precisely in and through international negotiations that expert publics will emerge.
- Large-scale conferences aimed at initiating long-term negotiations can make sense if they are used to shape public opinion in a level-headed, integrative

fashion. This leads to a conception of international negotiation processes with major conferences and continuous detailed negotiations - a conception that is already being pursued in the case of ozone, climate, and biodiversity policies.

4.5 Outlook

The continuing institutionalization of international environmental policy is revitalizing ideas and concepts that were under discussion in the German-speaking countries at an earlier point of time, even though the discussion then may have been conducted with a different terminology. The global governance discussion can, for instance, profit from the concept of *Ordnungspolitik.* Other central ideas, such as *participation, intergenerational pact, trusteeship,* are likewise potentially powerful. Here we can learn certain lessons that should be adhered to in the further development of international environmental policy.

Independently of whether or not the task of (re)activating such ideas and concepts meets with success, we have to bear in mind some *important national presuppositions* of an effective *international environmental policy.* These include above all:

- a heightened political awareness of global environmental problems and the conditions under which they emerge;
- sufficient (which is to say: greater) capacities for analyzing and processing global environmental problems and the pre-conditions required to solve them;
- an increase in the competence and commitment of national representatives on international panels with direct and indirect environmental relevance (like UNEP, GEF, WTO, etc.).

But the *credibility of national reform initiatives,* in the sense of consistency between the approaches toward innovative international environmental policy with the national level projects, could prove to be of even greater significance. The important thing is not only the compatibility of environmental initiatives with other activities involved in foreign policy, for instance the necessary ecological reform of the GATT/WTO regime; new instruments of environmental policy - such as environmental taxes, "joint implementation," and emission certificates - could be convincingly propagated at the international level only if national environmental policy is adjusted accordingly. And as far as AGENDA 21 is concerned, the mobilization of many local AGENDA initiatives is a *sine qua non* for the success of this new approach to policy. On many of these issues, it seems, there continues to be a need for further scientific clarification and political action.

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