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Harald Sondhof*

UNCED: No Consensus on Combating the Greenhouse Effect?

Concrete steps aimed at combating global warming (or the "greenhouse effect") are intended to be decided at the United Nations Conference on Environment and Development, which is to be held in Rio de Janeiro in June 1992. So far, it has not proved possible to reach a consensus on several decisive questions. The final meeting of the Preparatory Committee in March offers the last chance of achieving a rapprochement.

At the United Nations Conference on Environment and Development (UNCED) it is intended to adopt an outline agreement "containing appropriate commitments, and any related instruments as might be agreed upon".[1] The United Nations is supporting such an agreement as it has now been realized that no one country or region is capable on its own of safeguarding the natural climatic balance.

The conference is being arranged by the Preparatory Committee for UNCED (PrepCom) which is engaged in formulating an international action programme ("Agenda 21") on development and the environment. The intention is that this Agenda 21 should stipulate binding agreements on the protection of the climate. Parallel to this, the Intergovernmental Facilitating Committee on Climate Change (IFC), which deals solely with climatic protection, is conducting negotiations aimed at achieving a World Climate Convention.

However, with only a few months to go before the UNCED commences, it is still not possible to tell what form the agreements and the planned climate convention will take. On decisive aspects, a consensus has hitherto failed to materialize not only between the developing countries and the industrialized countries but also within the community of industrialized countries itself:

☐ There are differing levels of willingness to combat global warming because assessments of the threat posed by it vary.

☐ It has so far not been possible to reach a consensus on the question as to whether the CO_2 emissions from the energy sector, which are mainly to blame for global warming, should be reduced and the extent to which this should take place.

☐ The manner in which funds should be procured and administered in order to assist developing countries is still an open question.

There are signs that the conference will be used by the various parties primarily as a forum for allocating blame to one another.[2] The German Federal Ministry of the Environment is also being reticent when it comes to forecasting any possible results of the conference. As the problems posed by the man-made greenhouse effect are now generally accepted by the scientific world, the likelihood of UNCED failing in its material aims gives cause for serious concern from the environmental point of view.

The greenhouse effect is essentially a natural phenomenon which has become problematic because human activity has caused the concentration of certain climate-affecting trace gases ("greenhouse gases") in the upper atmosphere to rise considerably. The naturally occurring greenhouse gases have been joined by emissions which originate from human activity and serve to amplify the greenhouse effect. As a result, the average global temperature is increasing above its natural level.[3]

A distinction needs to be made between global warming

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[1] Resolution 45/212 of the General Assembly of the United Nations dated December 21, 1990.

[2] Cf. Christina Lamb: Summit in danger of crashing to earth, in: Financial Times, November 7, 1991, p. 21.

[3] On the following, cf. J. T. Houghton, G. J. Jenkins, J. J. Ephraums (eds.): Climate Change. The IPCC Scientific Assessment, Cambridge/UK 1990, p. iix; German Bundestag (ed.): Protecting the Earth. A Status Report with Recommendations for a New Energy Policy, Third Report of the Enquête Commission of the 11th German Bundestag "Preventive Measures to Protect the Earth's Atmosphere", Vol. 1, pp. 136 ff.

resulting from human activity and the problem of depletion of the stratospheric ozone above the polar regions (the "hole" in the ozone layer). The two areas do overlap in that the chlorofluorocarbons (CFCs) which actually cause the ozone problem and do not occur naturally also contribute substantially to the greenhouse effect. However, the destruction of the ozone layer leads above all to increasing short-wave ultraviolet radiation which is harmful to human, animal and plant life as well as to marine ecosystems.

The driving force behind the greenhouse effect is solar energy. Two thirds of this energy is absorbed by the Earth's surface and by the lower atmosphere, while the remainder is reflected back into the upper atmosphere and beyond. In direct proportion to its rate of absorption of energy (short-wave), the Earth itself radiates energy (long-wave), thus keeping the energy balance in a state of equilibrium. The quantity of energy radiated from the Earth depends on the global temperature level attained within this state of equilibrium.

The sun warms the Earth to an average temperature of around –18° C. The actual Earth temperature is, however, around + 15° C on average, i.e. about 33 degrees higher. This additional heating is caused by the "greenhouse" properties of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), among others, which absorb some of the long-wave terrestrial radiation in the upper atmosphere and reflect it back to Earth. It could therefore be said that the sun's heat is utilized twice over as a result of the greenhouse effect.

According to present scientific knowledge, the additional heating of the atmosphere through human activity, the man-made greenhouse effect, may cause the polar ice caps to melt and world sea levels to rise uncontrollably. Regions which today lie in the vicinity of coastlines might become exposed to the danger of flooding. Deserts might expand and, under certain circumstances, permafrost zones may turn into gigantic swamp regions. Agriculture and stock-rearing could be jeopardized in those very parts of the world which are already among those most at risk (Brazil, Peru, the Sahel Zone, South-East Asia, the Asiatic part of the former USSR, and China).[4]

Willingness to Act

In spite of agreement on the workings of the man-made greenhouse effect, willingness to take concrete action varies in degree throughout the world. Not only the USA and Great Britain, but also a number of developing countries have, for various reasons, hitherto proved reluctant to take concrete measures to combat global warming. The EC and other Northern European countries, on the other hand, have been urging speedy action.

One reason for these different attitudes is that although the available model calculations serve as a means of orientation, they are unable to provide precise information on the magnitude of the climatic changes caused by the greenhouse effect. Owing to the large number of possible cause-and-effect relationships within the climatic system, it has not yet been possible to make definite statements regarding the anticipated extent and time-frame of the warming process.

According to forecasts by the Intergovernmental Panel on Climate Change (IPCC), established by UNEP and the World Meteorological Organization (WMO), the mean global temperature will have risen by up to five degrees centigrade and the sea level by up to half a metre by the end of the next century.[5] On the other hand, the Max Planck Institute in Hamburg, whose new climate model is regarded as the most authoritative at present, predicts an increase in the Earth's temperature of 0.8 to 2.9° C and a rise in world sea levels of 6 to 16 cm by the year 2085.[6]

The only feature that the various forecasts have in common is that the global warming will take place within a shorter time span than ever before in the Earth's history. It

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[4] Cf. W. J. McG. Tegart, G. W. Sheldon, D. C. Griffiths (eds.): Climate Change. The IPCC Impacts Assessment, Canberra 1990.

[5] Cf. J. T. Houghton, G. J. Jenkins, J. J. Ephraums (eds.), op. cit., p. xxii.

[6] Cf. Federal Ministry of Research and Technology (ed.): Klimaszenarien-Rechnungen, pp. 5 f.

is expected that the temperature will increase more rapidly over the next hundred years than it did over the whole of the period since the last Ice Age.[7] Irrespective of the actual scale of the warming, the Earth's ecosystems will have little time at their disposal to adapt gently to the new climatic conditions.

A second reason for the lack of mutual agreement is that differing approaches are being followed for determining the kind of action needed. These approaches can be designated as the "cost-benefit" approach and as the "risk" approach.

Cost-Benefit Approach

The basis used by the cost-benefit approach is that the costs for combating global warming should not be higher than the value of the damage which can be averted by the measures in question. Accordingly, the efficient level of environmental investment is determined by a comparison of marginal and opportunity costs.[8]

Not surprisingly, this position is advocated by the USA which, as the largest contributor to the greenhouse effect, would also have to bear the bulk of the costs for comprehensive reduction of greenhouse gas emissions. The USA wants to be sure that better research is done into the different causes of global warming and to prepare a quantified assessment of the expected damage before entering into the corresponding obligations.[9]

The problem with this approach lies, on the one hand, in its basic assumption that climatic change is a gradual and linear development and, on the other, in the fact that it is difficult to quantify precisely what the opportunity cost of failing to act would be. What is the value of a forest in comparison with that of a steppe? If this value is set at a low level, as was done in a study by a US economist, William Nordhaus, it turns out that the optimum approach to combating global warming in economic terms is already attained simply by abandoning the use of CFCs, a course of action which involves only low costs.[10]

Risk Approach

The risk approach, on the other hand, takes the view that the need for action has to be oriented towards long-term environmental goals. These goals are stipulated by the ecosystem itself, by its limited and unalterable capacity to adapt. If certain threshold values are exceeded, the risk of uncontrolled reactions increases. This appears to apply particularly to the Earth's climate, as has been ascertained by the IPCC: "The complexity of the system means that we cannot rule out surprises."[11]

At the present level of scientific knowledge, the threshold values are considered to be a 0.1° C increase in the mean global temperature and/or a 2 to 5 cm rise in sea level in the course of a decade. Therefore, in order to ensure that climatic changes remain below these threshold values, it will already be necessary to make substantial short-term efforts aimed at reducing the concentration of greenhouse gases in the atmosphere.[12]

The positions being represented within the negotiations for a world climate convention evidently differ above all in the assessment of the risk involved in following a wait-and-see policy. A good many experts, however, doubt that there is much time left to sit and wait for the findings of scientific research into such a risk. This view is at all events taken by the Enquête Commission of the German Bundestag: "Because of the precarious nature of the situation, drastic measures have to be envisaged..."[13]

CO_2 Emissions from the Energy Sector

Owing to the fact that it is the industrialized countries which are primarily responsible for global warming, through the burning of fossil fuels, it is these countries which must act first, insofar as agreements can be reached on worldwide emission limits. Even though reduction of CO_2 emissions would have far-reaching consequences for the economies of industrialized countries, such measures are nevertheless necessary because developing countries will base their own efforts on the behaviour of the industrialized countries. Unfortunately, a substantial reduction of CO_2 emissions is not in sight.

About 50% of the greenhouse gases being emitted at present emanate from the energy sector (including the transport industry) and consist chiefly of CO_2 (80%) and methane (20%). The production and utilization of CFCs accounts for a further 20% of the gases and around 15% result from the destruction of tropical rain forests. The remaining 15% are methane emissions from cattle-

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[7] Cf. German Bundestag (ed.), op. cit., Vol. 1, p. 41.

[8] Cf. Peter Hoeller, Andrew Dean, Jon Nicolaisen: Macroeconomic Implications of Reducing Greenhouse Gas Emissions: A Survey of Empirical Studies, OECD Economic Studies, No. 16, Spring 1991, pp. 45-75.

[9] Cf. Inter Press Service: U. S. hits proposals on the atmosphere, UNCED PrepCom3, Daily Press Bulletin 02/2, August 13, 1991.

[10] Cf. William Nordhaus: A Sketch of the Economics of the Greenhouse Effect, in: American Economic Review, Papers and Proceedings, May 1991, pp. 146-150.

[11] Cf. J.T. Houghton, G.J. Jenkins, J.J. Ephraums (eds.), op. cit., p. xii.

[12] Cf. Robert J. Swart, Monique J. M. Hootsmans: A Sound Footing for Controlling Climate Change, in: International Environmental Affairs, Spring 1991, p. 130.

[13] Cf. German Bundestag (ed.), op. cit., Vol. 1, p. 5.

[14] Cf. J.T. Houghton, G.J. Jenkins, J.J. Ephraums (eds.), op. cit., pp. 41 ff.; German Bundestag (ed.), op. cit., Vol. 1, pp. 45 f.

farming and rice cultivation (as well as other areas such as landfills and cement production).[14]

80% of the CO_2 emissions resulting from energy production originate in the industrialized countries, including those of Eastern Europe. The individual countries chiefly responsible are the USA, which alone accounts for almost 24% of all energy-related CO_2 emissions, the former USSR, China and the Federal Republic of Germany including the former German Democratic Republic. Statistically more pertinent than the total emissions are the per capita emissions, as these serve as a good means of assessing the actual scale of energy squandering. The former GDR, with an output of 21.2 tonnes of CO_2 per inhabitant, leads the field, followed by the USA with 19.7 tonnes.

CFC emissions are attributable almost exclusively to the industrialized countries of the West, even if some developing countries do possess such production plants. It is evidenced by sales figures and types of utilization (e.g. in air-conditioning systems) that use is hardly ever made of CFCs in the southern hemisphere, and presumably also in the industrial countries of Eastern Europe.[15]

The contribution of the Western industrialized countries, including Japan, to the greenhouse effect is approximately 50% without taking agriculture into consideration.[16] In the developing countries, on the other hand, the figure is approximately 30%, with two thirds of this made up by emissions from the burning of tropical rain forests and one third by energy-related emissions. China and the former planned economies of Eastern Europe and the Soviet Union provide the remaining 20% or so, originating almost exclusively from emissions produced by the energy sector. If the cumulative emissions of greenhouse gases since the beginning of the last century are considered, the pattern of responsibility shifts even more clearly towards the (Western) industrial nations.

Table 1

The World's Major Producers of CO_2 Emissions

Country	Emissions in tonnes per inhabitant	Emissions in million tonnes
USA	19.7	4,766
Canada	17.0	436
Germany	13.7	1,067
("Old" Fed. Rep.)	11.7	715
(Former Dem. Rep.)	21.2	352
Former USSR	13.2	3,737
Poland	12.7	478
Great Britain	11.9	676
Japan	7.5	914
France	6.9	384
Italy	6.4	365
China	1.9	2,030
India	0.7	539
Total	12.7 (mean)	15,392
World (Total emissions)	4.1 (mean)	20,055

Source: German Bundestag (ed.): Protecting the Earth. A Status Report with Recommendentations for a New Energy Policy, Third Report of the Enquête Commission of the 11th German Bundestag "Preventive Measures to Protect the Earth's Atmosphere", Vol. 1, pp. 50f.

What has been undertaken by the industrialized countries in the past to combat global warming? There have in fact been few concrete steps, except in the CFC field. At the beginning of 1989, the Montreal Protocol came into effect, stipulating the detailed implementation of the 1985 Vienna Convention on the Protection of the Ozone Layer. Although the actual purpose of the agreement is to arrest the destruction of the ozone layer, the substitution or abandonment of CFC production demanded in it has so far proved to be the only effective measure for combating global warming.

The Protocol contains a list of CFCs of which consumption has to be reduced to half of the 1986 level by 1999. The list of gases to be reduced has been extended by a supplementary protocol which was adopted in London in June 1990 and which now envisages putting production of these substances to a complete halt. An Ozone Fund has been set up for the purpose of compensating developing countries for their renunciation of CFC production facilities.

There is still a long way to go before similar steps are taken towards the limitation of energy-related CO_2 emissions. Certain major industrial countries are showing little inclination to commit themselves to a thorough reorganization of their energy policies. The USA for example, which does not regard the greenhouse problem in itself as being as alarming as other countries feel it to be, points out that in the process of eliminating CFC use it has reduced its total quantity of greenhouse emissions to below the level of 1987 and therefore sees no further need for action at the present time. Similar standpoints are represented by Great Britain and Japan.[17]

For as long as the industrialized countries neglect to set target values for CO_2 emissions, the willingness of developing countries to undertake special efforts on their

[15] Ibid., pp. 483 f.

[16] Measures to limit emissions from the agricultural sector are regarded as difficult to initiate. Cf. Intergovernmental Panel on Climate Change: Climate Change. The IPCC Response Strategies, 1990, p. 117.

[17] Cf. John Hunt: UK backs voluntary greenhouse gas targets, in: Financial Times, June 26, 1991, p. 3; Rachel Johnson: US shrugs off pressure on greenhouse gas emissions, in: Financial Times, July 18, 1991, p. 4.

own part for protection of the climate will continue to be low. This is all the more an aggravating factor in that the energy-related emissions of many developing countries will inevitably increase significantly in the future. In the wake of intensified industrialization, energy consumption will in fact initially rise in above-average proportions, if the experiences of certain newly industrialized countries are anything to go by. In the case of countries such as India, it is expected that energy consumption will increase by 80% to 130% by the year 2000 alone.[18]

Likewise, when the industrialized countries demand that the tropical rain forests be protected, the developing countries react by arguing that those responsible for most of the pollution should first reduce their high CO_2 emissions.[19] Yet the preservation of the rain forests is really an environmental policy objective in its own right, because the destruction of forests causes the diversity of species to diminish considerably and thus leads to irretrievable losses in the Earth's genetic heritage. Between 50% and 75% of all species are thought to live in the ecosystem of tropical forests, the majority of which are not even known at the present time.[20]

Thus a great deal depends on the willingness among Western industrialized countries in particular to take the lead in setting good examples in the energy sector. Unless the industrialized countries depart from their rigid attitudes towards lowering their CO_2 emissions, it is highly unlikely that mutual agreement will be reached either on the question of energy-saving industrialization in developing countries or on the protection of rain forests.

The Problem of Funding

Binding agreements on the provision of funds by wealthy countries are of decisive importance for the success of any international agreement aimed at protecting the Earth's atmosphere. Even if they are willing to take the necessary measures, developing countries lack the financial resources and the technology for combating global warming. As is only to be expected, negotiations on this question are fraught with particular difficulties.

The problems to be solved are threefold. First of all, estimates must be made of the sums which are necessary worldwide for dealing with the greenhouse effect. Secondly, the point must be clarified as to how such funds are to be raised and by whom. Thirdly, it is necessary to find a mechanism for ensuring that the finances, once provided, will be efficiently used.

Only approximate data are available on the amount of financing required to combat the greenhouse effect on an international scale. According to research by the Worldwatch Institute, the financial requirements for energy-saving measures and for the protection of forests will total around US$ 350 billion for the period up to the year 2000.[21] Estimates prepared by McKinsey & Co. on behalf of the Netherlands are of a similar magnitude. They show an annual financing requirement of approximately $ 30-40 billion, corresponding more or less to the value of the official development aid being provided today.[22]

Of the above amount, approximately $ 600-700 million are needed to provide substitutes for CFCs, $ 10-15 billion for protecting the rain forests and around the same sum for investment in energy saving in the Third World. Preliminary investigations show, however, that it is in fact possible under certain conditions to achieve a significant reduction in emissions with a lower level of financing.[23]

The discussion as to how financial resources should be procured and distributed, notwithstanding the level of the financing requirement, reached deadlock in late 1991.[24] The findings of the Bundestag's commission of enquiry (Enquête Commission) one year previously continues to apply: "The way in which this assistance is to be offered is as yet completely uncertain... In addition, there are also widely varying views about the sources from which such a fund should be financed and about who should decide on the use of the funds to be distributed."[25]

A whole series of innovative mechanisms for generating the financial resources for investing in the environment are now being discussed. The proposals range from the reapportioning of military expenditure (at present, $ 900 billion are spent on armaments each year) to the issuing of "Earthcare Bonds" and onwards to the establishment of environment lotteries.[26] The concept of "debt-for-nature swaps", which has already been tried and tested in practice, is another significant element of the discussions.[27]

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[18] Cf. German Bundestag (ed.), op. cit., Vol. 2, p. 827; Jänicke et al., cited in Udo Simonis: Beyond Growth, Elements of Sustainable Development, Berlin 1990, p. 102.

[19] Cf. Inter Press Service: G-7 and G-77 still feuding over forests, UNCED PrepCom3, Daily Press Bulletin 11/2, August 26, 1991.

[20] Cf. José Goldemberg, Eunice Ribeiro Durham: Amazônia and National Sovereignty, in: International Environmental Affairs, Winter 1990, pp. 22 ff.

[21] Cf. IUCN, UNEP, WWF (eds.): Caring for the Earth. A Strategy for Sustainable Living, Gland, Switzerland, October 1991, p. 202.

[22] Cf. McKinsey & Co.: Protecting the Global Environment. Funding Mechanisms, November 1989, pp. 35-36.

[23] Ibid., p. 30; Tim Jackson: Least-Cost Greenhouse Planning, in: Energy Policy, January/February 1991. One conclusion reached by this study is that investment in atomic energy is not justifiable for reasons of costs.

[24] Cf. The Impasse on Financial Issues, in: Independent Sector's Network '92, No. 11, October 1991, p. 1.

[25] German Bundestag (ed.), op. cit., Vol. 2, p. 840.

[26] Cf. IUCN, UNEP, WWF (eds.), op. cit., p. 172.

The establishment of a system of worldwide energy taxes is being examined with particular interest, even though the form to be taken by such a system is not yet definite. If such taxes were to be levied, the primary objective could either be the fiscal aim of raising funds or that of altering patterns of behaviour. In the latter case, very high rates of taxation would be necessary in view of the low elasticity of the demand for energy. These high rates would then need to be offset at the national level.[28]

Demands on Industrial Countries

Irrespective of the manner in which financial resources are generated, the developing countries are making two demands on the industrialized countries and these demands are not being accepted automatically by the latter:

☐ Firstly, the resources should essentially be made available in addition to the transfer payments made under official development aid. Under the principle of additionality, the extra financing requirement arising through environmental problems should also be covered by supplementary funds from the wealthy countries. The developing countries are totally against the already scarce financial resources of development aid having to be used as well for preserving the environment, particularly as it is the wealthy countries which have the greater interest in such preservation. The new idea of "green" conditionality, i.e. that of making development aid dependent on environmental criteria, is rejected by the developing countries as undemocratic.[29]

☐ Secondly, the developing countries are insisting on the unrestricted right of co-determination as regards utilisation of the financial means made available for environmental protection. They are therefore arguing strongly in favour of financing responsibilities being transferred to those institutions in which they participate on the basis of "one country, one vote" or in favour of a new, independent, environmental organisation being established. Their model in this respect is the Ozone Fund, which is financed exclusively by the industrialized countries but in which they have equal decision-making rights on the use of the funds.[30]

The majority of industrialized countries, however, reject the idea of establishing new financing authorities and would rather see the responsibilities of international environmental protection transferred to the World Bank, which they regard as an efficient administrator. They would like to restrict any additional administrative expenditure and to ensure that they retain a certain amount of influence on the allocation of funds. The Federal Republic of Germany also supports the proposal by the USA to expand the Global Environmental Facility (GEF) into a comprehensive mechanism for the financing of international environmental measures (the GEF was established in early 1991 by the World Bank in cooperation with UNEP (U.N. Environment Programme) and with UNDP (U.N. Development Programme).[31]

The developing countries have voiced strong criticism at the establishment of the GEF since the policies of the World Bank are determined principally by the main contributors, the G-7 countries. In fact, even some representatives of industrialized countries at PrepCom have voiced their suspicion that the GEF was established so promptly with the intention of pre-empting the creation of an environmental financing body which would be less subject to control by its main financiers.[32]

Non-Binding Agreements?

Observers believe that some form of international agreement on climatic protection will definitely be signed in June 1992. Now that the subject has acquired such high publicity, it will hardly be in the interest of the policy-makers to fail to come to such an agreement. There is too much international prestige at stake, including for the United Nations, for this is only the second time since 1972 that the organization has staged a major environmental conference.

The fourth and final meeting of the Preparatory Committee (PrepCom IV), taking place in New York in March 1992, offers the last chance of achieving a rapprochement among the varying attitudes. The attitude of the USA, hitherto the most unequivocal opponent of binding measures, will be of decisive importance for the success of the negotiations. At all events, the extent to which a political reorientation will result from the increasing isolation of the American position, even within the G-7 Group, remains to be seen. In view of the many open questions, the fear is that the agreements will ultimately be of a highly non-committal nature.

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[27] Cf. Jens Rosebrock and Harald Sondhof: Debt-for-Nature Swaps: A Review of the First Experiences, in: INTERECONOMICS, No. 2, 1991, pp. 82-87.

[28] Cf. the interview with Joseph Wheeler in: Independent Sector's Network '92, op. cit., p. 10.

[29] Cf. Inter Press Service: Third world fears a new era of green conditionality, UNCED PrepCom3, Daily Press Bulletin 04/3, August 15, 1991.

[30] Cf. Inter Press Service: Third world wants more funds to restore ozone, UNCED PrepCom3, Daily Press Bulletin 02/1, August 12, 1991.

[31] Cf. Statement by the Federal Ministry of the Environment, Nature Protection and Nuclear Safety, 3rd Session of the UNCED PrepCom, Geneva, August 12 – September 4, 1991, Plenary item 2 (c), Financial Resources.

[32] Cf. Inter Press Service: Third world suspicious of 'green fund' in world bank, UNCED PrepCom3, Daily Press Bulletin 15/1, August 30, 1991.