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THE WHITE HOUSE

WASHINGTON

May 7, 1990

MEMORANDUM FOR D. ALLAN BROMLEY
WILLIAM K. REILLY
RICHARD STEWART
FRED BERNTHAL
C. BOYDEN GRAY
DICK SCHMALENSEE
BOB GRADY
THERESA GORMAN

FROM: STEPHEN DANZANSKY

SUBJECT: Position Paper for Bergen Conference

Attached for your review is a draft position paper prepared by the State Department for the delegation to the Bergen Conference. It attempts to respond to the changes suggested by our strategy task force (described in the second attachment). Several sections of the paper should be reviewed carefully to ensure that the revised positions satisfy our concerns:

(1) The fall-back position regarding the precautionary principle, described on page 4 (with the first position being deletion of the principle in its entirety), which seeks to insert the converse of the concept of doubt not being used to postpone action, i.e., doubt not being used as the sole justification for action.

(2) The suggested revision to the language regarding the cost-effective methods of preventing and minimizing emissions, described on page 10. The response is to note that abatement strategies must be established based on cost-benefit analysis, with their implementation being tied to cost-effectiveness. State asserts that this is what has always been intended and that this clarification will be acceptable to the other parties at Bergen.

(3) The non-bracketed language in the declaration reflecting the relative importance of human health over biological degradation, discussed on page 17. State argues that opening this language would invite possible amendments from other nations, most of which we would probably not want; it would prefer to hold this suggested change in reserve and offer it if another nation opens this section for modification.

As the delegation is leaving within the next few days, any revisions must be worked out quickly. Please provide me or Barry McBee with your comments by noon on Tuesday May 8.

STRATEGY TASK FORCE RECOMMENDED CHANGES
TO
STATE DEPARTMENT DRAFT INSTRUCTIONS TO POSTS RE:
9 March 1990
DRAFT BERGEN MINISTERIAL DECLARATION

- Paragraph 6 (Declaration paragraph 7): Confirm that deletion of "precautionary principle" is first priority. Fall back position, if bracketed language is not deleted, is to delete all wording after "degradation," namely, "even if final scientific proof is lacking. Doubt should not be used as a reason for postponing measures to prevent environmental degradation."

- Paragraph 7 (Decl. para. 12c): Strongly confirm that U.S. cannot abide CO_2 targets and timetables. We will accept first bracketed language to the extent that it accurately repeats language of Noordjwig but will not walk forward or backward from Noordjwig agreement.

- Paragraph 9 (Decl. para. 13b): Emphasize USG objection to any language calling for "phasing out" of toxics as ultimate aim and substitute instead the standard of protecting the public health. Public health protection should be the primary motivating force.

- Paragraph 12 (Decl. para. 12c): Contrary to State draft the USG should not support the first option as presently drafted. The language implies that we must be guided by the principle of prevention and minimization of emissions but do so in the most cost-effective manner. The test must be cost-benefit, not cost-effective, so that costs of prevention are always weighed against the economic consequences. The test must come before the commitment to prevention and minimization not after the decision is made.

  Similarly the USG alternative language should also reflect the concept of cost-benefit tied to prevention and minimization.

- Comment on non-bracketed language (Decl. para. 5): Changes must be made in draft Declaration to modify and shift emphasis in statement of Common Challenge contained in draft Declaration para 5. Human health must take preeminence over biological degradation and should be the primary (and thus first in order) motivator and responsibility of governments. Likewise the word "may" must be inserted before "threaten many of the earth's biological systems..." This will be dealt with by delegation during final negotiations since it isn't within bracketed language.

4/30/90

BERGEN CONFERENCE: "ACTION FOR A COMMON FUTURE"

May 8-16
Bergen, Norway

POSITION PAPER

I. THE JOINT AGENDA FOR ACTION

The Joint Agenda for Action (JAA) will be the focus of activity and discussion during the May 8-11 "Working Session" of the Bergen conference. The JAA was drafted jointly by representatives of industry, science, youth, labor, and environmental NGOs as a more detailed statement of environmental objectives than the Ministerial Declaration. At the March 5-9 Geneva Prepcom for the Bergen conference, ECE government representatives negotiated together and with representatives of the five interest groups to produce the present document. Crucial to the willingness of the ECE governments to accept the document was the addition of the second and third paragraphs of the "Introduction". These paragraphs characterize the JAA as "a variety of policy and action proposals (which) ... warrant study, elaboration, or further action," or "discussion, consideration, or decisions." Paragraph three explicitly notes that inclusion of an item in the JAA does not pre-judge the final view of any of the participants.

The intent of the second and third paragraphs is to enable the JAA to serve as a safety valve, where ideas on which there was no consensus for inclusion in the Ministerial Declaration could nevertheless be listed by the conference as worthy of discussion without commiting governments to action. It is therefore essential that the non-binding intent of the second and third paragraphs be maintained.

Further evidence of the desire of the ECE governments to regard the JAA as a non-binding document is contained in paragraph three of the Ministerial Declaration where the JAA is referred to by the phrase "of which we take note," one of the lowest orders of diplomatic recognition.

Representatives of the five interest groups also meeting at Bergen are likely to propose additions or revisions to the JAA during the Working Session, when representatives will address sessions devoted to a discussion of the four main concerns of the conference: awareness raising and public participation; sustainable energy use; sustainable industrial development; and the economics of sustainable development. So long as nothing inconsistent with the intent of the second and third paragraphs is proposed, the US can be relatively flexible in considering any such proposals for inclusion in the document if they seem appropriate for consideration by governments or NGOs.

Each of the five interest groups holding their own conference at Bergen is expected to adopt a list of "commitments", or an "agenda", embodying goals toward which the interest groups will work. It is expected that these groups will request that these commitments or agendas be added to the JAA, to give them some standing as Bergen conference documents. The method agreed upon by ECE governments and NGO representatives at the Geneva Prepcom was that these commitments would be accepted as attachments or annexes to the JAA, so long as they are clearly identified as such, with clear lines of demarcation between the NGO commitments and the core of the JAA.

US Objectives Concerning the Joint Agenda for Action

--maintain the non-binding nature of the JAA, as expressed in its second and third paragraphs.

--ensure clear identification of NGO "commitments" or "agendas" and a clear demarcation between such statements and the body of the JAA if such statements are proposed for addition to the JAA.

--maintain a posture of flexibility and openness to other proposed additions or revisions in the JAA so long as the proposals could correctly be judged to be worthy of "discussion, consideration, or decision."

--use the opportunities presented by the Working Session to convey an impression of open-mindedness, of willingness to cooperate with NGOs to achieve environmental objectives, and to stress the commitment of the USG to the principles of sustainable development.

II. THE MINISTERIAL DECLARATION

Points are dealt with in sequence where bracketed language appears in the Declaration. Because the present draft represents the result of extensive negotiations at the Geneva Prepcom, re-opening negotiations on any language which is not bracketed at present should be limited largely to grammatical and syntactical points. To do more than this would open the entire document for review, which would not likely be in USG interests.

Paragraph 7: Precautionary Principle

Achieving a satisfactory resolution of this issue is essential if the USG is to join in the ECE consensus on the Ministerial Declaration.

Bracketed Paragraph:
"7. [Policies must be based on the precautionary principle. Environmental measures must therefore anticipate, prevent and attack the causes of environmental degradation, even if final scientific proof is lacking. Doubt should not be used as a reason for postponing measures to prevent environmental degradation.]"

Objective: Deletion of the paragraph from the Declaration.

Fall-back objective: Define the principle in terms the USG can accept.

Background: The US was alone at Geneva in objecting to the inclusion of paragraph 7, contending that the language is unclear and that we could not be sure what kind of commitment is intended. The likelihood of deleting the paragraph is low.

The precautionary principle (PP) has begun to appear in a number of documents introduced at international environmental meetings, particularly those dealing with marine pollution. The Nordics and the FRG are strong advocates.

The principle does not have an internationally-agreed definition. Some have described it as expressing the general notion that it is desirable to prevent pollution. Others have described it as meaning that before an activity may be undertaken, it must be proven by the activity's proponent that the activity will not harm the environment. In effect, this interpretation shifts the burden of proof from the opponent of an activity to show harm to the proponent of an activity to show no harm.

Talking Points in Favor of Deletion

--The PP does not have an agreed definition.

--The draft declaration language is too broad and open-ended.

--It poses a "single-criterion" decision rule for making policy judgments on complex issues with many economic, socio-cultural, as well as scientific aspects. The approach is impractical in that it does not allow sufficient latitude for taking into account the particular activity in question, nor the likelihood, nature, or magnitude of potential harm.

--A strict application of the PP implementing measures to prevent environmental degradation even where the threat is in doubt would cause societies to use scarce resources or costly regulatory measures in ways that might later be found not to attack the real problem. Investments to reduce uncertainty (e.g. in research) can in many circumstances be more cost-effective measures to prevent environmental degradation than a frontal attack on threats which may be poorly understood. Indeed, costly assaults on problems later shown not to exist could undermine credibility and public support for well-founded programs of environmental protection.

Fall-back Position

Option A: Seek to reword the definition of the precautionary principle in paragraph 7 to bring it into line with the President's "no regrets" policy.

Propose as substitute for paragraph 7:

"Policies promoting sustainable development should be based on the principle of a precautionary approach inherent in responsible stewardship. Environmental measures must therefore anticipate, prevent, and attack the causes of significant environmental degradation, even if final scientific proof is lacking. Doubt should not be used as a reason for postponing measures to prevent environmental degradation, nor should doubt alone be invoked as adequate justification for action."

"Must" is acceptable in place of "should" if necessary to achieve the acceptance of this proposal.

If objection is raised to the phrase "inherent in responsible stewardship", the phrase may be dropped if it assists in gaining acceptance of the other changes proposed above.

Talking Points in Favor of Option A

--This language recognizes the need to take action where significant possibilities of degradation exist, even in cases of scientific uncertainty.

--It recognizes that scientific uncertainty should not be invoked to justify postponing measures, but balances this recognition by noting that it is equally true that scientific uncertainty cannot be invoked alone to justify action.

Option B: Make the paragraph less specific by shortening it to read:

"Policies must be based on the precautionary principle. Environmental measures must therefore anticipate, prevent, and attack the causes of environmental degradation."

Talking Points in Favor of Option B

--We accept the need to deal prudently with scientific uncertainty. Such uncertainty, however, should not be invoked as justification for action where the nature of the threat to be addressed is unclear.

--All of our societies face limited financial resources and must employ these prudently. Costly assaults on problems later shown not to exist could undermine credibility and public support for well-founded programs of environmental protection.

Paragraph 11d: Economic and technological assistance

Bracketed Paragraph:
"(d) To support, in addition to present development assistance, programmes by multilateral agencies to increase the flow of capital and environmentally benign technology to developing and East European countries, [through financial mechanisms appropriate to the economic conditions of each country, to meet incremental costs incurred in addressing international obligations to protect the global environment.] OR [in support of high priority resource and environmental management projects, especially those that protect the international environment.] [To participate actively, throught existing fora, to establish a mechanism to finance the reduction of ozone depleting substances to assist developing countries implementing their obligations under the Montreal Protocol.] Furthermore, donors and multilateral agencies should take into account the relationship between debt service burdens and the ability of countries both within and outside the ECE to carry out measures which ensure the protection of the environment. We will also urge that bilateral and multilateral partners and financial institutions take full account of environmental considerations and opportunities for natural resource savings in their project and structural adjustment lending operations, and that these operate in an efficient and non-wasteful manner."

Objective: Adoption of the first bracket. ["through financial mechanisms appropriate to the economic conditions of each country, to meet incremental costs incurred in addressing international obligations to protect the global environment."]

Talking Points in Favor

--This general statement allows flexibility in determining the appropriate mechanisms for assistance, and is applicable to a wide variety of global environmental problems.

Fall-back Position: The second bracket is acceptable.

Paragraph 11d (Third Bracket): Funding Mechanism for Montreal Protocol Obligations

(Third bracket: "To participate actively, through existing fora, to establish a mechanism to finance the reduction of ozone depleting substances to assist developing countries implementing their obligations under the Montreal Protocol.")

Objective: We prefer the deletion of this third bracket on grounds that the question of how to assist developing countries to meet their obligations under the Montreal Protocol is being actively addressed at the present time in negotiations devoted specifically to amending the Protocol. This question need not be addressed in the Bergen declaration. The point can also be considered as covered in the language of the first bracket. The third bracket also contains bad syntax.)

Fall-back Position: Accept the bracket, since the USG is already doing what it calls for. However, attempt to substitute "establish means to help finance" for the phrase "establish a mechanism to finance".

Paragraph 11e: Tariff and Non-tariff Barriers on Trade With Developing Countries

Bracketed Paragraph:
"(e) To accelerate in the OECD and other appropriate fora, the dialogue on the interlinkages between environmental and trade policies. The dialogue should focus on, inter alia, the role of international trade in promoting sustainable development through growth and increased efficiency, and the application of trade rules and instruments to environmental measures [and the reduction of tariff and non-tariff barriers on the imports of goods from developing countries.]"

Objective: Eliminate the reference to "imports" and "developing countries" by substituting the following:

> "and the reduction of tariff and non-tariff barriers which hinder sustainable development."

Talking Points in Favor of Substitution

--We support the reciprocal reduction of tariff and non-tariff barriers to trade, but the language presently contained in the declaration suggests an assymetrical reduction which would only favor developing countries. We believe the ECE desire to recognize the special needs of developing countries can be accomplished by adopting the more general language we propose.

Fall-back Position: Revise the bracket to read "and the reciprocal reduction of tariff and non-tariff barriers on international trade."

Paragraph 12b: The IPCC and Protocols to a Framework Climate Change Convention

Bracketed Language:
"(b) To reaffirm support for the IPCC as the principal forum for scientific assessment related to climate change; the potential impacts of such change; and the options available for preventing or adapting to changes in the climate of the earth. We pledge our nations to continued support for the work of the Panel [after its interim report this August.] We pledge our full support for the early completion of the work on a framework convention on climate change and the [subsequent] development of protocols dealing with, inter alia, greenhouse gases and forestry."

Objective: Drop the brackets--keep the phrase--in the sentence "We pledge our nations to continued support for the work of the Panel [after its interim report this August.]"

Talking Point in Favor of Keeping the Phrase

--Virtually all parties agreed at the IPCC Plenary in February that the work of the Panel should continue after the issuance of its interim report.

Objective: Retain the word "subsequent" so that the final sentence in this paragraph reads:

"We pledge our full support for the early completion of the work on a framework convention on climate change and the subsequent development of protocols dealing with, inter alia, greenhouse gases and forestry."

Talking Point in Favor of Retention of the Word "Subsequent

--It is premature to commit ECE members to negotiate protocols to a convention which itself has not yet been drafted.

--It was agreed at the Geneva Prepcom that the word "subsequent" would be accepted. Bracketing the word was a clerical error by the Secretariat.

Paragraph 12c: CO2 and Greenhouse Gas Levels

Achieving a satisfactory resolution of this issue is essential if the USG is to join in the ECE consensus on the Ministerial Declaration.

Bracketed Language:

"(c) [To recognize the need to stabilize, while ensuring stable development of the world economy. CO2 emissions and emissions of other greenhouse gases not controlled by the Montreal Protocol. The industrialized nations agree that such stabilization should be achieved by them as soon as possible, at levels to be considered by the IPCC and the Second World Climate Conference.] OR [to take other actions to stabilize the overall CO2 emissions at present levels by the year 2000. This is a preliminary target which has to be considered in the light of the recommendations from the IPCC and Second World Climate Conference.] The process of the IPCC should be supported by the investigation of the feasibility of achieving targets to limit or reduce CO2 emissions including e.g. a 20% reduction of CO2 emission level by the year 2005 as recommended by the Scientific World Conference on the Changing Atmosphere in Toronto 1988."

Objective: Do not exceed or walk backward from the commitment entered into in the Noordwijk Declaration. Retain the first bracket in the paragraph and drop the second.

Talking Point in Favor of Repeating Noordwijk Declaration Language

--It is premature to pre-judge the outcome of the IPCC process by entering into new commitments on greenhouse gases at the present time.

--It is unwise to give undue prominance to CO2. It is well established that CO2 is only one of many greenhouse gases which need to be reduced to solve the problem of global climate change.

--Bergen is an opportunity to consolidate much good work of the recent past. It is not an occasion to extend committments previously agreed upon in the Noordwijk Declaration or in other fora. We must concentrate now on carrying out undertakings previously agreed upon before we decide what further commitments may be called for. Let us not in our impatience to achieve real progress in facing the many environmental problems before us send the wrong signal to the rest of the world. This would surely be the result if the major industrialized nations of the world were reported as being unable to reach a consensus on this extremely important issue.

Paragraph 12f: Abatement Strategies/Best Available Technologies/Critical Loads

There are 3 bracketed versions proposed under this point:

"(f) [The establishment of adequate abatement strategies should be guided by the principle of prevention and minimization of emissions in the most cost-effective way.]

OR

[Our work to formulate abatement strategies should make use as appropriate of the priniciple of best available technology not entailing excessive costs [or other cost-effective policy options] to ensure that local, regional and global critical loads are [achieved] OR [not exceeded.]

OR

[The concept of critical loads, at a local, regional and global level, should [not be exceeded and] OR [where possible,] serve as an underlying principle to guide our national efforts to formulate abatement strategies. Such strategies will be devised according to national circumstances and may include best available technologies or other economically efficient approaches.]"

Objective: Revise the paragraph to read:

"The establishment and implementation of adequate abatement strategies should be guided by the principle of prevention and minimization of emissions in the most cost-beneficial and cost-effective way."

Talking Points to Support Revision of First Bracket

--Delegation may discuss the comprehensive approach the US takes toward the question of abatement strategies.

Talking Points to Oppose Second and Third Brackets

--This language gives too much prominence to the concept of "best available technology". While this concept may be useful at times, it needs to be employed with care only when circumstances fully justify it.

--US experience with the "best available technology" standard has convinced us that the use of this concept as a benchmark standard can result in undesirable and perverse consequences, both environmental and economic.

--BAT imposes a stagnant technology standard chosen by governments rather than by expert engineers and scientists in the field. Once the technology is installed, a firm has no further incentive to develop new and better technology or otherwise to control pollution further until governments impose new standards.

--Incentive-based approaches are preferable because they provide continuing motivation for firms to develop better pollution control methods and to use resources efficiently.

Paragraph 12g: Fuel Consumption by Automobiles

Bracketed Paragraph:
"(g) To introduce and update an energy labelling system and voluntary agreements or mandatory standards, as may be appropriate, for products and processes aimed at improving energy efficiency of buildings and appliances and to ask the ECE to review progress in this regard at regular intervals. [In particular governments will consider targets for energy efficient cars, taking into account the experience gained with prototypes which have achieved 2 to 4 litres per 100 km under special conditions]."

Objective: Eliminate the reference to cars "which have achieved 2 to 4 liters per 100km".

Talking Points in Favor of Dropping This Bracket

--This point is too specific for a ministerial declaration. It detracts from the ministerial quality of the Declaration as a whole.

--The point is covered in a preferable, more general way in paragraph 12i, second tick-mark, where it is stated that governments should promote "energy efficient vehicles with low emission levels."

Paragraph 12j, third tick-mark: Renewable Sources of Energy

> "(All relevant international organizations are requested) to redress imbalances between institutional arrangements for renewable sources of energy compared with those for nuclear and other conventional sources."

Objective: Delete this point. If not possible to delete it, relocate it within the Declaration, with a more appropriate preambular phrase.

Talking Point for Deletion of "Institutional Imbalance" Point

> --This is an inappropriate task to assign to "international organizations" for action. If we accept that an institutional imbalance does exist, then it is national governments, not international organizations, which should address the issue and seek to correct the imbalance.
>
> --In this case, this point should be moved elsewhere in the "Sustainable Energy Use" section, and should be re-written to read:
>
> "All ECE member countries should work individually and collectively towards redressing any imbalances which may exist between institutional arrangements for addressing issues related to renewable sources of energy, compared to existing arrangements for addressing questions related to nuclear and other conventional sources."
>
> --However, the United States is not convinced that there is in fact an institutional imbalance in the handling of these issues. We would ask delegations which support the inclusion of this point to explain to us the nature of the perceived imbalance.

Paragraph 13: Best Available Technologies/Critical Loads

Bracketed Language:

"(13.) The ECE countries should further develop cost-effective bilateral and regional strategies for preventing pollution. [This should be based on appropriate use of best available technology not entailing excessive costs or other cost effective measures, so as to ensure that local, regional and global critical loads are not exceeded.]"

Objective: Replace "cost-effective" with "cost-beneficial" both places where it appears. The first replacement is in the opening, non-bracketed sentence. Procedurally it would probably be easier to obtain agreement to substituting "cost-beneficial" within the bracket, and then noting that editorial consistency would then require a similar change in the opening unbracketed sentence.

Talking Point for "Cost-Benefit" Substitution

> --"Cost-benefit" means that the costs of prevention are always weighed against the economic consequences. This test must come before the commitment to prevent pollution, not after the decision is made. Once a decision has been made to pursue a course of action, it would then be implemented in a "cost-effective" manner, i.e., in an economically efficient way.

Paragraph 13b: Phasing Out of Toxic Substances

Achieving a satisfactory resolution of this issue is essential if the USG is to join in the ECE consensus on the Ministerial Declaration.

Bracketed Language:
"(b) To encourage the safe and appropriate use and disposal of hazardous substances. To accelerate work on reducing the use and emission of hazardous substances that are toxic, persistent, and bioaccumulative [with the ultimate aim of phasing them out.] [Prepare regional timetables by 1992 for phasing out the most environmentally damaging substances.]"

Objective: (1) Delete references to "phasing out" the use of toxic substances. Re-focus attention on the point that it is the protection of the public health which should be our primary concern. Our efforts should be to reduce the risks associated with the use of such substances.

(2) Place period after "bioaccumulative", drop remaining two brackets.

Background: A significant number of ECE members, with Sweden the most vigorous advocate, want to commit to phasing out toxic substances. These are not further defined in paragraph 13b, but the Joint Agenda for Action makes explicit reference to the "Black List" of the Paris Convention for the Prevention of Marine Pollution from Land-based Sources, a list of about 1000 toxic substances including the heavy metals mercury and cadmium. These substances are also sometimes referred to as the "Sunset List" in reference to proposals to phase them out of use. At an April OECD meeting in Stockholm, participants agreed upon a more comprehensive approach incorporating the concept of total risk reduction, which may moderate somewhat the previous insistence on total phase-out as a goal.

Talking Points in Favor of Dropping References to "Phasing Out" Toxic Substances

--Our primary concern should be the protection of the public health. We strongly support work to reduce risks associated with the use of hazardous substances. This commitment may result in the phase-out of some chemicals, but leaves open the consideration of factors such as the availability of substitutes, economic considerations, and risk assessments.

--We cannot commit ourselves to a blanket phasing-out of all hazardous substances without regard to needs, costs, or other benefits from their use.

--Even without the bracketed phrases, we believe paragraph 13b contains a significant commitment by ECE members which can be regarded with satisfaction. "Accelerating work" on reducing the use and emission of these substances is the appropriate commitment at our present state of knowledge.

Fall-back objective: Revise the first bracket to read:

["with the ultimate aim of overall risk reduction, taking into account benefits from their use, availability of substitutes, economic considerations, and risk assessments."]

Substitute the following for the second bracket:

["Prepare timetables for completion of scientific and economic assessments and for establishing timing and targets for the subsequent reduction in the use of environmentally damaging substances."]

Paragraph 13d: Extra-territorial Application of Environmental Standards

Bracketed Language:
"(d) To encourage investors to [apply, as a minimum], OR [take into account] environmental analysis procedures and the environmental standards required in their home country to investments abroad. Industry and government should co-operate in establishing guidance for this purpose."

Objective: Adopt the second bracket: domestic environmental standards should be "taken into account" when investors invest abroad.

Talking Points in Favor of Deleting First Bracket ("apply as a minimum")

--Environmental standards to be applied to investments abroad should be determined by the host country, in the absence of binding international agreements.

--Applying domestic environmental standards abroad, as a minimum, suggests that the developed country's standards would carry more weight than those of the country receiving the investment. Many developing countries would object to this attitude.

--In bidding on projects in other countries, countries having the strictest environmental standards would be placing their companies at a competitive disadvantage compared to other companies from countries which might have lower standards.

--In our view, each country should develop and enforce its own laws and regulations to safeguard its environment. Standards developed in one country may not always be applicable to another. It is fine to take these standards into account, but to apply them as a minimum in some other country raises a variety of other difficult issues. How would the enforcement of such "minimum standards" be enforced abroad, for instance?

Paragraph 14e: Environmental Impact Assessments

Bracketed Language:
"(e) [To undertake the prior assessment and public reporting of the environmental impact and risks of any policies, plans, projects, products or industrial facilities that may have significant] effects on human health and state of the environment OR [To undertake the prior assessment and public reporting of the environmental impact of projects which are likely to have a significant effect on the human environment and, so far as practicable, of the policies, programmes and plans which underlie such projects] and to ensure that developing countries are assisted through bilateral and multilateral channels in evaluating the environmental impact and sustainability of their own development projects."

Objective: Seek adoption of the second bracket:

Talking Points in Favor of the Second Bracket

--We are already following this practice in the US.

Paragraph 14f: Rights of Individuals to Participate in Decision-Making Process

Bracketed Language:
"(f) To reaffirm and build on the CSCE conclusions regarding the rights of individuals, groups and organizations concerned with environmental issues, and in addition to safeguard the rights of individuals and concerned groups to have access to all relevant information and to be consulted and participate in the planning and decision-making concerning activities which may affect health and environment with reasonable access to appropriate legal or administrative remedies and redress [according to national regulations and administrative practices.]"

Objective: Prefer to see the bracketed phrase dropped, but are flexible on this point.

Talking Point in Favor of Dropping Bracketed Phrase:

--The commitment is stronger without the qualifying phrase at the end. The phrase is already implied by "reasonable access to appropriate legal or administrative remedies and redress."

III. ADDITIONAL ISSUES

Paragraph 5: Threat to Human Health and Biological Systems

Paragraph is not bracketed at present:
"5. Today environmental degradation and depletion of resources threaten many of the earth's biological systems as well as human health and the quality of human life. Unsustainable patterns of production and consumption, particularly in industrialized countries, are at the root of numerous environmental problems, notably the depletion of the resource base which would foreclose options for future generations."

Objective: Revise the first sentence to read:

> "Today environmental degradation and depletion of resources may threaten human health as well as the earth's biological systems and the quality of human life."

Talking Points in Favor of Revision

> --There are a few places in the text which, even though not bracketed, could be improved if small editorial or syntactical changes could be made.
>
> --It is important when we speak to the entire ECE community and to the general public at large that we not be unduly alarmist in our assessments of the environmental challenges we face.
>
> --Insertion of the word "may" before "threaten" more accurately reflects the current state of our scientific knowledge. The consequences of many environmental challenges are by no means certain. We recognize the possibility of a threat to human health and other biological systems, but the exact nature and extent of this threat is in many cases unclear.
>
> --Human health should be our preeminent concern, even before biological degradation. For this reason we believe it should be spoken of before reference to the earth's biological systems.

Charter of Environmental Rights and Obligations

Objective: Oppose any recognition of the idea of embodying environmental rights in a charter.

Background: A group of experts hosted by the Dutch government has drawn up a proposed environmental rights charter. A briefing on this charter was presented to the March Geneva Prepcom but no thorough discussion of the idea took place. We understand that this charter, which has the support of some NGOs, may be presented for consideration at Bergen, either to the working sessions devoted to the Joint Agenda for Actyion or to the ministerial sessions. The long-range objective of this effort seems to be the adoption of a document on environmental rights by the 1992 UN Conference on Environment and Development.

Talking Points on "Charter of Environmental Rights and Obligations"

--We firmly support political and civil rights, but do not believe that environmental "rights" should be the subject of an international "charter."

--We recognize that one of the objectives of supporters of an environmental rights charter is to promote citizens' rights to participate in the policy formulation process. We believe this issue was squarely addressed in the November 1989 Sofia CSCE Conference Declaration, and that it would be a mistake for the ECE to take any action which would divert attention from the important commitments agreed upon at that time.

F
Workshop
Global
Climate
Change
(IPCC)

United States Department of State

Bureau of Oceans and International Environmental and Scientific Affairs

Washington, D.C. 20520
March 23, 1990

UNCLASSIFIED

MEMORANDUM

To: Distribution

From: OES - Richard J. Smith

Subject: RSWG Legal Mechanisms Paper

Attached is the revised legal mechanisms paper prepared by the international topic coordiators. We have worked with the British and Canadians informally to ensure, as was agreed in February, that the structure of the paper is that of an "issues" paper. The paper is a distinct improvement over the previous two versions and would appear to be a valuable contribution to future negotiators.

We are seeking to clarify the status of the two U.S. contributions on existing legal agreements and institutional arrangements; as you may recall, they were to be attached as appendices to this report.

Roger Beetham has invited one representative each from a limited number of RSWG members (20) to attend a meeting in mid-April to further refine the paper. In preparation for that meeting, we request that you submit any comments to Sue Biniaz (phone: 647-1370; fax: 647-1037) by March 30.

IPCC: RESPONSE STRATEGIES WORKING GROUP

Legal Measures: Report of Topic Co-ordinators (Canada, Malta and the UK)

1. The following report has as its primary objective the discussion of elements that might be included in a future framework Convention on Climate Change, and a discussion of the issues that are likely to arise in the context of developing those elements.

2. There is a general view that while existing legal instruments and institutions with a bearing on climate should be fully utilized and further strengthened, they are insufficient alone to meet the challenge. A very broad international consensus has therefore emerged in the IPCC, confirmed notably at the 44th United Nations General Assembly, on the need for a framework Convention on Climate Change. Such a Convention should generally follow the format of the Vienna Convention for the Protection of the Ozone Layer, in laying down, as a minimum, general principles and obligations. It should further be framed in such a way as to gain the adherence of the largest possible number and most suitably balanced spread of countries; contain provision for separate annexes/protocols to deal with specific obligations, eg research and systematic observation, obligations concerning greenhouse gases. As part of the commitment of the parties to action on greenhouse gas emissions and the adverse effects of global warming, the Convention would also address the particular financial needs of the developing countries and the question of the access to and transfer of technology.

3. The paper points out a number of issues to be decided in the negotiation of a Convention. In general these are:

- the political imperative of striking the correct balance between the arguments for a far-reaching, action-oriented Convention and the need for urgent adoption of such a Convention so as to begin tackling

- the extent to which specific obligations, particularly on the control of emissions of carbon dioxide and other greenhouse gases, should be included in the Convention itself or be the subject of separate protocols;

- the timing of negotiation of such protocols in relation to the negotiations on the Convention.

4. In particular, within the Convention the following specific issues will need to be addressed:

(a) Financial needs of developing countries.
The need for additional resources for developing countries, and the manner in which this should be addressed, particularly in terms of the nature, size and conditions of the funding, even if detailed arrangements form the subject of a separate protocol.

(b) Transfer of technology. The basis on which the promotion of the development and transfer of technology and provision of technical assistance to developing countries should take place will need to be elaborated, taking into account considerations such as terms of transfer, assured access, intellectual property rights and the environmental soundness of such technology.

(c) Institutions. Views differ substantially on the role and powers of the institutions to be created by the Convention particularly in exercising supervision and control over the obligations undertaken.

5. The co-ordinators do not seek to make a value judgement in listing and summarising in the attached paper the elements proposed for inclusion in a framework Convention: their text seeks merely to assist the future negotiators in their task. They note however that a readiness to address the foregoing fundamental problems in a realistic manner will be a prerequisite for ensuring the success of the negotiations and the support of a sufficiently wide and representative spread of nations.

ELEMENTS FOR INCLUSION IN A CONVENTION ON CLIMATE CHANGE

1. PREAMBLE

In keeping with common treaty practice including the format of the Vienna Convention, the Climate Change Convention would contain a preamble which might seek to address the following items:

- a description of problem and reasons for action (need for timely and effective response while awaiting absolute scientific certainty);

- a reference to relevant legal instruments (such as the Vienna Convention and Montreal Protocol) and declarations (such as UNGA Resolution 43/53, Principle 21 of the Stockholm Declaration and the ENMOD Treaty);

- recognition that climate change is a common concern of mankind, affects humanity as a whole and should be approached within a global framework;

- recognition of the need for an environment of a quality that permits a life of dignity and well-being for present and future generations;

- reference to balance between sovereign right of states to exploit natural resources and concomitant duty to protect and conserve climate for benefit of mankind;

- endorsement of concept of sustainable development;

- recognition of the need to improve scientific knowledge (eg through systematic observation) and to study the social and economic impacts of climate change;

- recognition of the importance of development and transfer of technology and of the circumstances and needs, particularly financial, of developing countries; need for regulatory, supportive and adjustment measures to take into account different levels of development of countries;

- recognition of responsibility of all countries to make efforts to limit or reduce greenhouse gas emissions and prevent activities which would adversely affect climate;

- recognition of need for development of strategies to absorb greenhouse gases, ie protect and increase greenhouse gas sinks; to limit or reduce anthropogenic greenhouse gas emissions and to adapt human activities to the impacts of climate change.

Other issues which may rise during the development of the preambular language could include:

- whether it is sufficient for the preamble to recognise the responsibility of all countries to address climate change, noting that most emissions currently and historically originate in industrialized countries where the scope for change is greatest; that emissions from developing countries may need to grow in order to meet development requirements and thus are likely to represent, over time, an increasingly significant percentage of global emissions; that implementation of the Convention may take place in different time frames for different categories of countries and may be qualified by the means at the disposal of individual countries and their scientific and technical capabilities;

- whether already in the preamble the particular problems of countries with an agricultural system vulnerable to climate change and with limited access to capital and technologies should be addressed, recognising the link with sustainable development;

- whether mankind's interest in a viable environment should be characterised as a fundamental right;

- whether there is an entitlement not to be subjected, directly or indirectly, to the adverse effects of climate change.

- whether, in view of the inter-relationship among all greenhouse gases, their sources and sinks, they should be treated collectively;

- whether a number of countries should be permitted to meet their aggregate global climate objectives through joint arrangements.

2. DEFINITIONS

As is the practice, definitions will need to be elaborated in a specific article on definitions. The actual terms to be defined will depend on the purpose of the Convention and thus the language used by the negotiating parties, and may need to include:

- climate;
- climate change;
- adverse effects;
- greenhouse gases;
- their sinks and sources;
- CO_2 equivalence.

3. GENERAL OBLIGATIONS

Following the format of such treaties as the Vienna Convention, an article would set out the general obligations agreed to by the Parties to the Convention. Such obligations may relate to, for example:

- the responsibility to adopt appropriate measures to protect against the adverse effects of climate change, to limit, adapt to, and as far as possible prevent, climate change and to avoid creating other environmental problems in taking such measures;

- the responsibility to protect and improve the composition of the atmosphere in order to conserve climate for the benefit of present and future generations;

- encouragement of steps having the effect of limiting climate change (eg reforestation, energy efficiency) but which are already justified on other grounds;

- exploitation of climate for peaceful purposes only and in accordance with the principles of good neighbourliness;

- co-operation by means of research, systematic observation and information exchange in order better to understand and assess the effects of human activities on the climate and the potential adverse environmental and socio-economic impacts that could result from climate change;

- encouragement of the development and transfer of relevant technologies, as well as the provision of technical and financial assistance, taking into account the particular needs of developing countries to enable them to fulfil their obligations;

- co-operation in the formulation and harmonization of policies and strategies directed at limiting, reducing, adapting to and, as far as possible preventing, climate change;

- co-operation in adoption of appropriate legal, administrative or regulatory measures to address climate change;

- provision for bilateral, multilateral and regional agreements or arrangements not incompatible with the Convention and its annexes/protocols, including opportunities for groups of countries to fulfil the requirements on a regional or sub-regional basis;

- permissibility of more stringent national or regional emission targets than provided for in the Convention and/or its annexes/protocols;

- co-operation with competent international organisations to implement effectively the objectives of the Convention;

- encouragement of and co-operation in the promotion of public education and awareness of the environmental and socio-economic impacts of greenhouse gas emissions and of climate change;

- commitment to formulate appropriate annexes/protocols on a sound scientific basis;

- strengthening of existing legal and institutional instruments and arrangements relating to climate change, and making full use of existing funding mechanisms.

Other issues which may be expected to arise in the process of elaborating this article might include the following:

- whether a provision should set any specific goal with respect to levels of emissions (global or national) or atmospheric concentrations of greenhouse gases while ensuring stable development of the world economy, particularly stabilisation by industrialised countries, as a first step, of CO_2 emissions and emissions of other greenhouse gases not controlled by the Montreal Protocol;

- whether a provision should recognise that implementation of obligations may take place in different time frames for different categories of country and/or may be qualified by the means at a parties' disposal;

- whether, in addressing the transfer of technology, the provision should address the terms of such transfers (ie commercial vs. non-commercial, preferential vs. non-preferential, the relationship between transfers and the protection of intellectual property rights);

- whether the question of additionality, with respect to financial assistance, or the development of new funding mechanisms and additional financial resources (eg a Climate Trust Fund), should specifically be mentioned in regard to aiding (compensating) developing countries in meeting their obligations under the Convention, particularly those which may have to bear an abnormal or special burden;

- whether to provide for prior notice and provision of relevant environmental impact assessment information of large-scale planned activities that are likely to cause signficant climate change;

- what should be the basis of emission targets in the protocols (eg per capita, GDP);

- the particular problem of sea level rise;

- how much detail the Convention should go into, eg over obligations in respect of co-operation in research and information.

4. INSTITUTIONS

It has been the general practice under international environmental agreements to establish various institutional mechanisms. The Parties to a Climate Change Convention might, therefore, wish to make provision for a Secretariat, a Conference of the Parties and a Bureau/Executive Committee. The Secretariat would perform certain administrative functions assigned to it under the Convention. The Conference of the Parties may, among other things: keep under continuous review the implementation of the Convention; review current scientific information; and promote harmonization of appropriate policies, strategies and measures for minimising the release of substances causing or likely to cause climate change. The Bureau/Executive Committee might be entrusted with functions in respect of surveillance, verification and compliance.

Issues that may arise in developing provisions for appropriate institutional mechanisms include:

- whether any of the Convention's institutions (eg the Conference of the Parties or the Bureau/Executive Committee) should have the ability to take decisions on response strategies or functions in respect of surveillance, verification and compliance that would be binding on all the parties and, if so, whether such an institution would represent all of the parties or be composed of a limited number of parties based on equitable geographic representation;

- if a trust fund or other financial mechanism were established under the Convention, whether there should be an institution for the administration of such a mechanism;

- whether or not to establish a Scientific Council to provide advice and make recommendations to the Conference of the Parties concerning research activities and measures to deal with climate change;

- whether to provide for the establishment of working groups, eg on scientific matters as well as on socio-economic impacts and response strategies.

5. RESEARCH AND SYSTEMATIC OBSERVATIONS

It would appear to follow general practice to include provision for co-operation in research and, particularly with respect to air pollution agreements, systematic monitoring. In terms of research, if one were to follow the Vienna Convention model, the parties might be called upon to undertake, initiate, and/or co-operate in, directly or through international bodies, the conduct of research on:

- physical and chemical processes that may affect climate;
- substances, practices, processes and activities that could modify the climate;

- techniques for monitoring and measuring greenhouse gas emission rates;
- improved climate models, particularly for regional climates;
- environmental, social and economic effects that could result from modifications of climate;
- alternative substances, technologies and practices;
- environmental, social and economic effects of response strategies;
- human activities affecting climate;
- coastal areas with particlar reference to sea-level rise;
- water resources; and
- energy efficiency.

Other issues that might arise in developing this provision might include:

- whether consideration should be given to the establishment of panels of experts or of an independent scientific board responsible for the co-ordination of data collection from the above areas of research;

- whether the parties should co-operate in promoting or establishing, directly and/or through competent international bodies, joint or complementary programmes for systematic monitoring of the climate, including a possible worldwide system;

- whether to co-operate in ensuring the collection, validation and transmission of research and observational data through appropriate data centres.

- the possibility of on-site inspection.

6. INFORMATION EXCHANGE AND REPORTING

Precedents would suggest the inclusion of provision for the transmission of information through the Secretariat to the Conference of the Parties on measures adopted by them in

implementation of the Convention and of protocols to which they are party. In an annex to the Vienna Convention the types of information exchanged are specified and include scientific, technical, socio-economic, commercial and legal information.

For the purposes of elaborating this provision, issues having to be addressed by the negotiating parties might include the following:

- whether there is the need for the elaboration of a comprehensive international research programme in order to facilitate co-operation in exchange of scientific, technological and other information on climate change;

- whether parties should be obliged to report on measures they have adopted for the implementation of the framework Convention, with the possible inclusion of regular reporting on their emissions of greenhouse gases;

- whether each party should additionally be called upon to develop a national inventory of emissions, strategies and available technologies for addressing climate change; if so, the Convention might also call for the exchange of information on such inventories, strategies and technologies.

7. TECHNOLOGY TRANSFER

While the issue of technology has been addressed in the section on General Obligations, it might be considered desirable to include a separate provision on technology transfer. Such a provision could call upon the parties to promote the development and transfer of technology and provision of technical assistance, taking into account particularly the needs of developing countries, to enable them to take steps to limit, reduce and as far as possible prevent climate change, or to adapt to it.

An issue that is likely to arise is whether special terms (eg preferential and/or non-commercial) would attach to climate-related transfers of technology. This provision will require further

consideration of issues related to assured access to, and transfer of, environmentally sound technologies on favourable terms to developing countries, and the protection of intellectual property rights.

8. CONSULTATION

The parties negotiating the Convention may wish to consider a provision on consultation between, on the one hand, parties whose planned activities are likely to cause climate change and, on the other hand, the Secretariat, relevant international organisations and other parties concerned.

9. SETTLEMENT OF DISPUTES

It would be usual international practice to include a provision on the settlement of disputes that may arise concerning the interpretation or application of the Convention and/or its annexes/protocols. Provisions similar to those in the Vienna Convention for the Protection of the Ozone Layer might be employed, ie voluntary resort to arbitration or the International Court of Justice (with a binding award) or, if neither of those options is elected, mandatory resort to conciliation (with a recommendatory award).

10. OTHER PROVISIONS

It would be the usual international practice to include clauses on the following topics:

- amendment of the Convention;
- status, adoption and amendment of annexes;
- adoption and entry into force of, and amendments to, protocols;
- signature;
- ratification;
- accession;
- right to vote;

- relationship between the Convention and its protocols;
- entry into force;
- reservations;
- withdrawal;
- depositary;
- authentic texts.

II. ANNEXES AND PROTOCOLS

The negotiating parties may wish the Convention to provide for the possibility of annexes and/or protocols. Annexes might be concluded as integral parts of the Convention, while protocols might be concluded subsequently (as in the case of the Montreal Protocol to the Vienna Convention on Protection of the Ozone Layer). The following among others, might be considered as possible subjects for annexes or protocols to the Convention:

- fossil fuels;
- carbon dioxide;
- agricultural practices;
- methane;
- nitrous oxide;
- tropospheric ozone;
- forestation;
- funding mechanisms;
- research and systematic observations;
- energy conservation and alternative sources of energy;
- protection of greenhouse gas sinks;
- liability and compensation;
- international emissions trading;
- emission control technologies;
- adaption technologies and practices;
- development and transfer of technology;

Issues that may arise in connection with the development of annexes and protocols include:

- whether a single annex or protocol might cover more than one of the above subjects (eg all greenhouse gases might be the subject of a single protocol);

- timing, ie, negotiating parties advocating a more action-oriented Convention may seek to include specific obligations in annexes as opposed to subsequent protocols;

- sequence, ie, if there are to be a series of protocols, in what order are they to be taken up (for example, whether priority should be given to those areas concerning which the state of scientific understanding is most develped or whether greenhouse gases should be treated in accordance with their significance in terms of contributing to climate change.

WMO

UNEP

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

POLICYMAKERS SUMMARY

OF THE

SCIENTIFIC ASSESSMENT OF CLIMATE CHANGE

Report to IPCC from Working Group 1

Second Draft, 12 March 1990

Redraft following discussion at the WGI Lead Authors Meeting
Edinburgh, 26 February - 2 March, 1990

Prepared by the IPCC Group at the Meteorological Office, Bracknell, UK

Executive Summary

We are certain of the following:

The greenhouse effect is real; natural greenhouse gases already keep the earth over 30°C warmer than it would otherwise be.

Man made emissions are substantially increasing the atmospheric concentrations of the main greenhouse gases: carbon dioxide, methane, the chlorofluorocarbons, and nitrous oxide. These increases will lead to a warming of the Earth's surface.

Our best tools predict that, in the absence of other effects, man made emissions will lead to the following changes:

By the year 2020, global mean temperatures will have risen 1.8 C above pre-industrial, with a probable range between 1.3 and 2.5 C; global mean precipitation and evaporation will have increased by 3%. By the year 2070, the range of temperature increase will be 2.4 to 5.1 C with a best estimate of 3.5 C, and precipitation will be 7% greater. Areas of snow cover and sea-ice will be smaller.

Regional changes will in most cases be different to the global mean; in general, land surfaces warm more rapidly than the oceans. Examples of regional change are that temperature increases in Southern Europe and North America will be higher than the global mean, accompanied by reduced summer precipitation and soil moisture.

Sea Level is expected to rise mainly due to the thermal expansion of the oceans and the melting of some land ice. Sea level will rise by about 20cm (with a probable range of 10cm to 32cm) by 2030, and by 2070 it will have risen 45cm (with a range of 33cm to 75cm). Within the next century, it is unlikely that there will be a major outflow of ice from the West Antarctic Ice Sheet due directly to greenhouse warming.

Our best judgement is that:

Global - mean surface air temperature has increased by 0.3 to 0.6 C over the last 100 years, with the six global-average warmest years being in the 1980s.

The size of this warming is broadly consistent with predictions of climate models but, because of natural variability and other factors, we cannot say how much of the observed temperature rise to date is due to man-made greenhouse gases.

There is no real evidence that climate has become more variable over the last few decades. However, episodes of high temperatures will become more frequent in the future simply due to an increase in the mean temperature.

Ecosystems will be affected by a changing climate and by increasing carbon dioxide concentrations. Many ecosystems disadvantaged by climate change will be unable to migrate fast enough, and will become prone to extensive damage by exceptional events such as drought and fire.

We calculate with confidence that:

Some gases are potentially more effective than others at changing climate; the Global Warming Potential index of each gas relates the warming effect of its emissions to those of equal emissions of carbon dioxide. Because carbon dioxide emissions are much larger than those of the other greenhouse gases, it is likely to be responsible for over half the total man-made greenhouse effect.

To stabilise the atmospheric abundances of most greenhouse gases at present levels would require reductions in man-made emissions of 50-80%; methane would require only a 15-20% reduction.

There is a long lag between changes in the emission of greenhouse gases and the resultant change in climate. Therefore, reductions in man-made greenhouse gas emissions will take decades to centuries to be become fully effective. Emission decreases made sooner will have a greater effect than the same decreases made later.

To improve our predictive capability, we need:

- To accelerate the development of numerical models.
- To undertake experimental and theoretical studies aimed at understanding critical processes within the climate system.
- To maintain and improve global observing systems, particularly those which are space-based.
- To increase support for national research activities, and for international programmes under which they can be carried out.

Introduction: what is the issue ?

There is concern that man may be inadvertently changing the climate of the globe through the enhanced greenhouse effect, by continuing to emit pollutants which will eventually cause the temperature of the earth to increase - the so called "global warming". If this occurs, consequent changes to sea level and to ecosystems may have a significant impact on society and economies.

The purpose of the Working Group I report, as determined by the first meeting of IPCC, is to provide a scientific assessment of:

1) the factors which may affect climate change during the next century especially those which are due to human activity.

2) the responses of the atmosphere - ocean - land - ice system.

3) current capabilities of modelling global and regional climate changes and their predictability.

4) the past climate record and presently observed climate anomalies.

On the basis of this assessment, the report presents current knowledge regarding predictions of climate change (including sea level rise and the effects on ecosystems) over the next century, the timing of changes together with an assessment of the uncertainties associated with these predictions.

This Policymakers Summary aims to bring out those elements of the main report which have the greatest relevance to policy formulation, in answering the following questions:

- What factors determine climate, and how might man change them?
- What are the greenhouse gases, and how and why are they increasing?
- Which gases are the most important?
- How much do we expect the climate to have changed by the year 2020 and beyond?
- How much confidence do we have in our estimation?
- What will be the effects on sea level and ecosystems?
- Are the predicted climate changes unusual?
- Has man already begun to change global climate?
- What should be done to reduce uncertainties, and how long will this take?

Throughout the report, we keep in mind the practical needs of the policymaker. The report is not an academic review, neither is it a plan for a new research programme. Uncertainties attach to almost every aspect of the report, yet policymakers are looking for clear guidance from scientists; hence authors have been asked to provide best-estimates wherever possible, together with an assessment of the uncertainties.

This report is a summary of our understanding as at mid-1990. Although continuing research will deepen this understanding and require the report to be updated at frequent intervals, basic conclusions concerning the reality of the greenhouse effect and its potential to alter global climate are unlikely to change.

What factors determine global climate and how might man change them ?

The driving force for weather and climate comes from the sun. The earth intercepts solar radiation (mainly in the short-wave, visible, part of the spectrum); about a third of it is reflected, the rest is absorbed by the different components (atmosphere, ocean, ice, land and biosphere) of the climate system. The energy absorbed from solar radiation must be balanced (in the long term) by outgoing radiation from the earth and atmosphere; this terrestrial radiation takes the form of long-wave invisible infra-red energy. As the amount of outgoing terrestrial radiation is determined by the temperature of the earth, this temperature will adjust to emit just the right amount of radiation to balance that coming from the sun.

There are several important factors which can change the balance between the energy (in the form of solar radiation) absorbed by the earth and that emitted by it in the form of longwave infra-red radiation - the **radiative forcing** on climate. The most obvious of these is a change in the amount or seasonal distribution of **solar radiation** which reaches the earth; these changes were probably responsible for initiating the ice ages.

One of the most important of these factors is the **greenhouse effect**. Shortwave solar radiation can pass through the clear atmosphere relatively unimpeded. But long-wave terrestrial radiation emitted by the warm surface of the earth is partially absorbed and then re-emitted by a number of trace gases in the atmosphere above. Since the atmosphere is cooler than the earth's surface, the emission to space is reduced. Both the atmosphere and the surface warm until the outgoing long wave radiation balances the incoming solar radiation.This is the basic greenhouse effect. The main greenhouse gases are not the major constituents, nitrogen and oxygen, but water vapour (the biggest contributor), carbon dioxide, methane, nitrous oxide, ozone in the low atmosphere and (in recent years) chlorofluorocarbons. Naturally occurring greenhouse gases keep the earth warm enough to be habitable, but their increase will raise temperatures- and change other aspects of climate, particularly precipitation and evaporation.

Other factors which affect climate are mentioned later in the Summary, when we discuss uncertainties in climate predictions.

Simple diagram illustrating the greenhouse effect

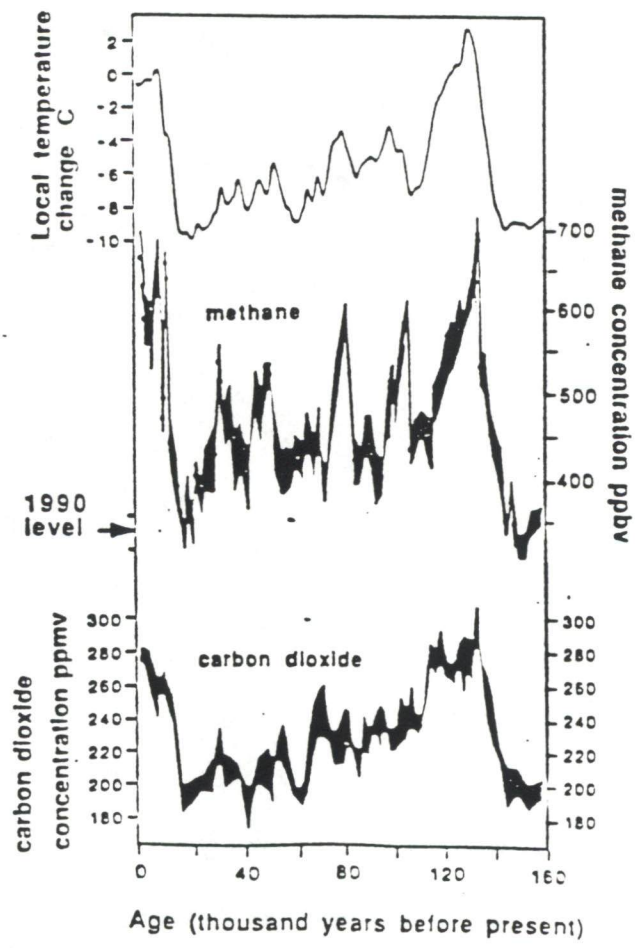
How do we know that the greenhouse effect is real ?

The greenhouse effect is **real**: infrared absorbing gases in the atmosphere make the surface of the earth warmer than it would otherwise be. It is a well understood effect, based on established scientific principles.

We know that the greenhouse effect works in practice, for several reasons. Firstly, the mean temperature of the earth's surface is already about 33 C warmer than it would be if the natural greenhouse gases (mainly carbon dioxide and water vapour) were not present. Satellite observations of the radiation emitted from the earth's surface and atmosphere demonstrate the absorption due to the greenhouse gases.

Secondly, we know the compositions of the atmospheres of Venus, Earth and Mars are very different, and their surface temperatures are in good agreement with greenhouse theory.

Thirdly, measurements from ice cores going back 160,000 years show that the earth's temperature closely paralleled the amount of greenhouse gases in the atmosphere. It is likely that changes in greenhouse gases were part (but not all) of the reason for the large (4 - 5 C) temperature swings between ice ages and interglacial periods.



The enhanced greenhouse effect

We are confident that an increase in concentrations of the greenhouse gases will raise the global, annual-mean surface-air temperature (which, for simplicity, is referred to as the "global temperature"). Strictly, this is an **enhanced** greenhouse effect - above that occurring due to natural greenhouse gas concentrations; the word "enhanced" is usually omitted, but it should not be forgotten. A global warming will cause sea levels to rise, partly due to the thermal expansion of the ocean surface waters, and partly due to the melting of land ice (but not due to the melting of sea ice - such as the north polar sea ice - which is already floating and thus displacing water).

What are the greenhouse gases and how are they changing ?

We know, with certainty, that the concentrations of greenhouse gases in the atmosphere have changed naturally on ice-age timescales, and have been increasing since pre-industrial times due to human activities. The table below summarizes the present and pre-industrial abundances, present rates of change and atmospheric lifetimes of the main greenhouse gases.

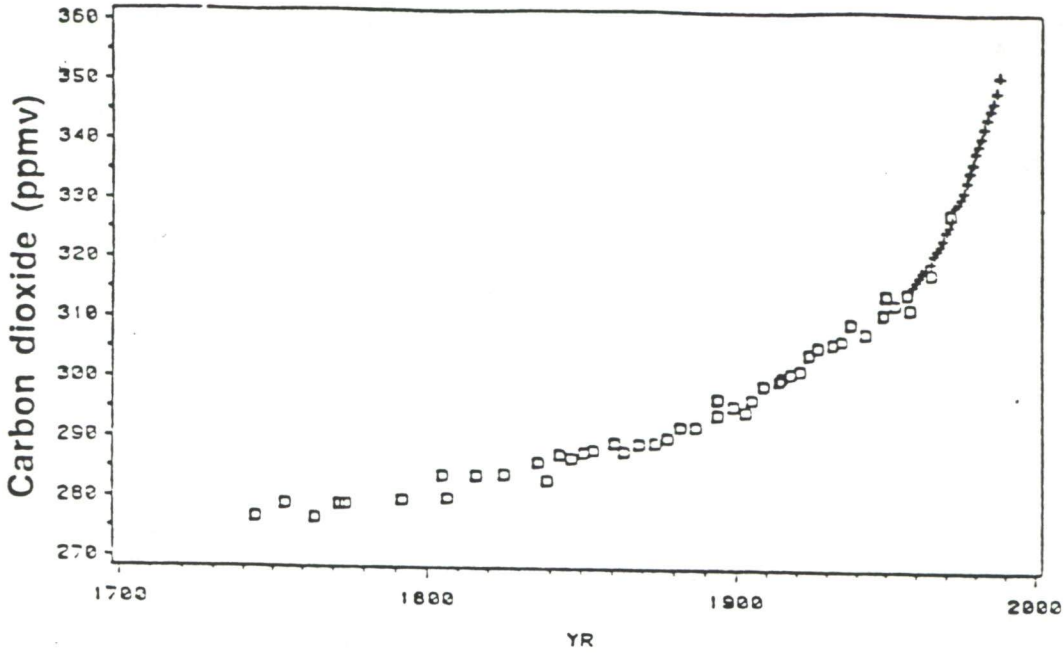
SUMMARY OF KEY MAN-MADE GREENHOUSE GASES

	Carbon Dioxide	Methane	CFC-11	CFC-12	Nitrous Oxide
Atmospheric concentration	ppmv	ppmv	pptv	pptv	ppbv
Pre-industrial	280	0.79	0	0	288
Present day††	354	1.717	280	484	310
Current rate of change	1.6 (0.5%)	0.015 (0.9%)	10 (4%)	17 (4%)	0.8 (0.25%)
Atmospheric lifetime (years)	(50-200)†	10	65	130	150

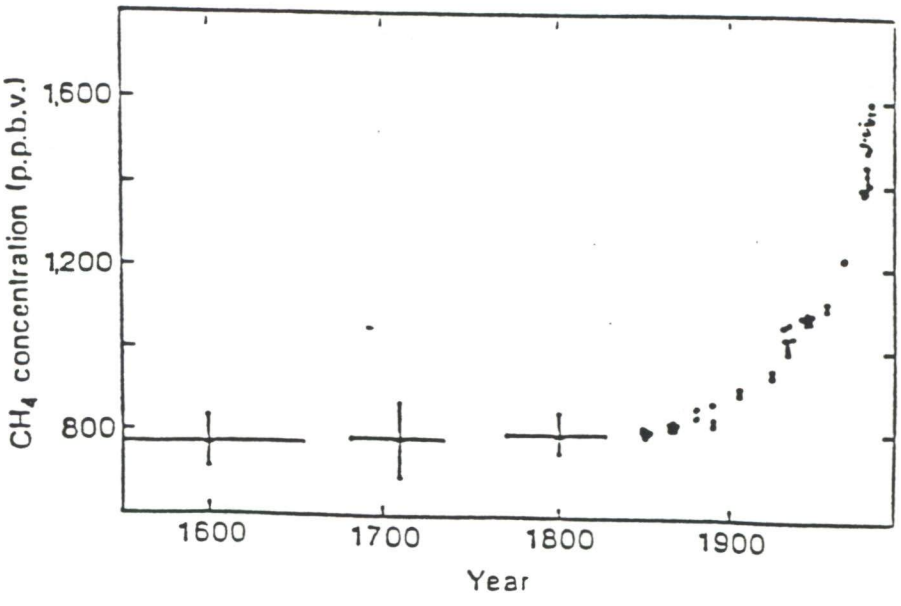
ppmv = parts per million by volume; ppbv = parts per billion by volume;
pptv = parts per trillion by volume.
† – The way in which CO_2 is absorbed by the oceans is not simple and a single value cannot be given
†† – estimated

Carbon dioxide, methane, and nitrous oxide all have significant natural and man-made sources, while the chlorofluorocarbons (CFCs) are purely man-made. Water vapour is also a major greenhouse gas and, although its concentration may also change in future, this will be as a consequence of any global warming and not as a direct result of man-made emissions; we incorporate the effects of this in the estimates of future climate change discussed later.

For a thousand years prior to the industrial revolution, the abundances of these greenhouse gases were relatively constant. However, as the world's population increased, and the world became more industrialized, the abundances of the greenhouse gases increased markedly. The figures below illustrate this for carbon dioxide and methane.



Carbon dioxide concentration from ice cores (squares) and surface observations (Mauna Loa - crosses)

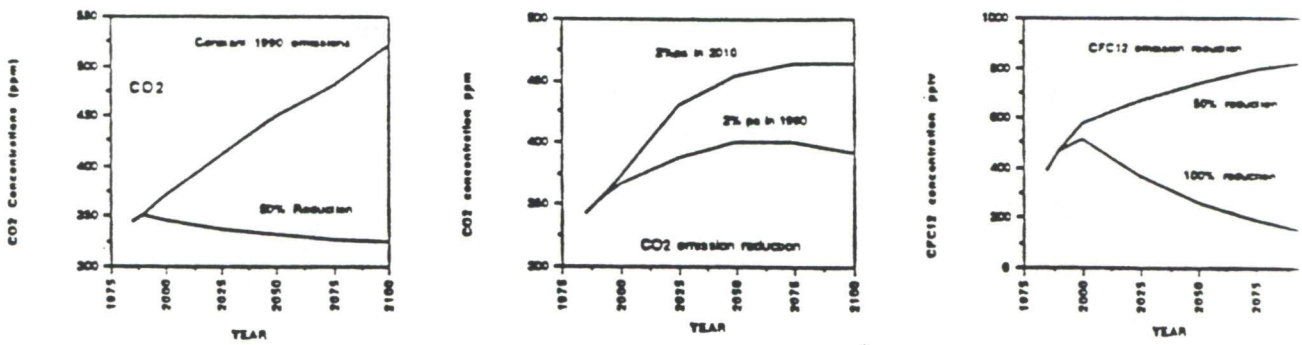


Methane concentration deduced from ice cores and from recent surface observations

We know quite well the reasons for the increased abundances of carbon dioxide, methane, chlorofluorocarbons, and tropospheric ozone, but those for nitrous oxide are less certain. Since the industrial revolution carbon dioxide has increased by 25% because of the combustion of fossil fuels and deforestation practices, in mid-latitudes and in the tropics. Methane has more than doubled because of rice production, breeding domestic ruminants, biomass burning, coal mining and ventilation of natural gas; transport and industry may have also contributed in an indirect way. Low - level ozone has doubled because of increased abundances of carbon monoxide, nitrogen oxides, and hydrocarbons from industry and transport; and nitrous oxide has increased by 8% probably because of fossil-fuel combustion or agricultural practices. Chlorofluorocarbons, which are used as aerosol propellants, solvents, refrigerants, and foam blowing agents were not present in the pre-industrial atmosphere.

Lifetimes and stabilisation of the gases

The lifetimes of the greenhouse gases are determined by their sources and sinks in the oceans, atmosphere and biosphere. Carbon dioxide, chlorofluorocarbons and nitrous oxide have long lifetimes; hence, following a change in emissions, their atmospheric concentrations respond slowly and would not reach a new equilibrium state for many centuries. In contrast, some of the CFC substitutes and methane have relatively short atmospheric lifetimes so that their atmospheric concentrations respond quite quickly and would reach a new equilibrium within a few decades following a change in emissions. This emission-concentration relationship is illustrated below for some of the gases.



It can be seen, for example, even with a complete cessation in the emission of CFC 12 in the year 1990, its atmospheric abundance would still be about a third of today's level in the year 2100. Also shown is the effect on concentrations of continuing man-made emissions of carbon dioxide at 1990 levels, or 50% of 1990 levels, and of a reduction in global emissions of 2% per year from 1990 and from 2010; if there are critical concentration levels that should not be exceeded then it can be seen that earlier emission reductions are more effective than later ones.

The term **"atmospheric stabilisation"** is often used to describe the limiting at present day values of the concentration of the greenhouse gases. The amount by which man-made emissions of a greenhouse gas must be reduced in order to achieve this is shown in the box below.

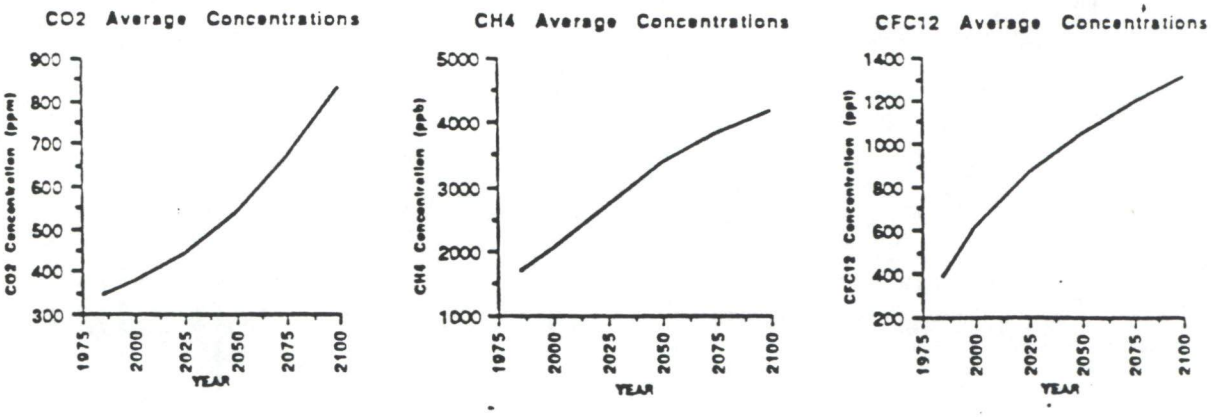
STABILISATION OF ATMOSPHERIC CONCENTRATIONS

Reductions in the man-made emissions of greenhouse gases required to stabilise concentrations at present day levels:

Carbon Dioxide	60 - 80%
Methane	15 - 20%
Nitrous Oxide	70 - 80%
CFC11	70 - 75%
CFC12	75 - 85%
HCFC22	40 - 50%

Natural sources and sinks are assumed to remain unchanged
Note that the stabilisation of each of these gases would have different effects on climate, as explained in the next section.

The same models used for these calculations are also used to determine future concentrations of the greenhouse gases which would arise from scenarios of future emissions generated by IPCC Working Group 3. Shown below are the concentration trends of some of the greenhouse gases expected to result from the High Emissions scenario.

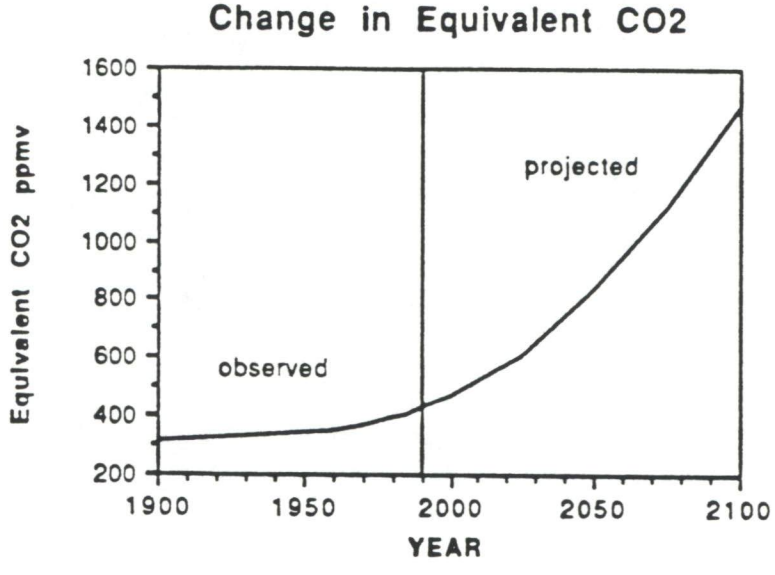


Which gases are the most important?

We know, with certainty, that more greenhouse gases means more radiative forcing and hence a global warming. We can calculate the the radiative forcing due to the increase in concentration of each gas with much more confidence than the calculation of the resulting climate change because the former only involves laboratory measurements of the gases: how strongly, and where in the spectrum,

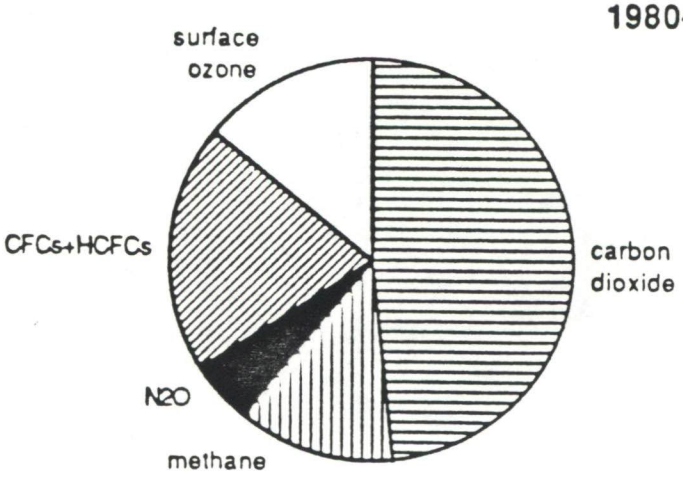
they absorb infra-red radiation. We then have a base from which to calculate the relative effect on climate of an increase in **concentration** of each gas in the atmosphere: both in absolute terms and relative to carbon dioxide. These relative effects span a wide range; methane is about 21 times more effective, molecule-for-molecule, than carbon dioxide, and CFC11 about 12 000 times more effective.

The total radiative forcing at any time is the sum of those from the individual greenhouse gases. For simplicity, we can express total forcing in terms of the amount of carbon dioxide which would give that forcing; this is termed the **equivalent carbon dioxide concentration**. We show how this quantity has changed to date (based on observations of all the greenhouse gases) and how it might change in the future (based on the IPCC Working Group 3 High Emissions scenario) in the figure below. At present, greenhouse gases have increased since pre-industrial times (the mid 18th century) by an amount that is radiatively equivalent to about a 53% increase in carbon dioxide, although carbon dioxide itself has only risen by 26% - other gases have made up the rest.



The contributions of the various gases to the total increase in climate forcing during the 1980s is shown below as a pie diagram; carbon dioxide is responsible for about half the decadal increase.

Contribution to climate forcing change: 1980-90



How can we evaluate the effect of different greenhouse gases?

To evaluate possible policy options, it is useful to know the relative radiative (and, hence, climate) effect of equal emissions of each of the greenhouse gases. The concept of relative **Global Warming Potentials (GWP)** has been developed which takes into account the differing times that gases remain in the atmosphere.

This index allows for the determination of the time-integrated, relative warming effect based on the instantaneous release of a unit mass (1 kg) of a given greenhouse gas. These GWPs are defined for convenience relative to carbon dioxide, the greenhouse gas of most concern. The GWPs in the following table are shown for three time horizons, reflecting the need to consider these cumulative effects on climate over various time scales.

The table indicates, for example, that the effectiveness of methane in influencing climate will be greater in the first few decades after initial release, whereas emission of the longer lived nitrous oxide will affect climate for a much longer period of time.The lifetimes of the proposed CFC replacements range from 1 to 40 years. The longer lived replacements are still potentially effective as agents of climate change. The extreme example of this, HCFC 143a (with a 40 year lifetime), has a very similar effect (when released in the same amount) to CFC11 on a 20 year timescale.

GLOBAL WARMING POTENTIALS

The warming effect of an emission of 1kg of each gas relative to that of CO_2

	time horizon		
	20 yr	100 yr	500 yr
Carbon dioxide	1	1	1
Methane	63	21	9
Nitrous oxide	270	290	190
CFC11	4500	3500	1500
CFC12	7100	7300	4500
HCFC22	4100	1500	510

Global Warming Potentials for a range of CFCs and potential replacements are given in the full text

Although the table shows carbon dioxide to be the least effective greenhouse gas on an equal emissions basis, the warming effect on will depend on the size of emissions. In the example shown below, 1990 emissions of carbon dioxide will contribute well over half the man-made warming effect over the next 100 years.

THE RELATIVE CUMULATIVE CLIMATE EFFECT OF 1990 EMISSIONS

	GWP (100yr horizon)	1990 emissions (Tg)	relative contribution over 100yr
carbon dioxide	1	26000†	61%
methane	21	300	15%
nitrous oxide	290	6	4%
CFC11	3500	0.3	2%
CFC12	7300	0.4	7%
HCFC22	1500	0.1	0.4%
Others (including indirect effects, eg that of NO2 on surface ozone)			10.6%

†26000Tg of carbon dioxide = 7Gt of carbon

There are other criteria which may help policymakers to decide, in the event of emissions reductions being necessary, which gases should be considered. Does the gas contribute in a major way to current, and projected future, climate forcing? Does it have a long lifetime, so that controlling its concentration would require emissions to be reduced sooner rather than later? And are its sources and sinks well enough known to decide which of them could be controlled in practice? The table below illustrates these factors.

GAS	MAJOR CONTRIBUTOR?	LONG LIFETIME?	SOURCES KNOWN?
carbon dioxide	yes	yes	yes
methane	yes	no	qualitatively
nitrous oxide	no	yes	qualitatively
CFCs	yes	yes	yes
HCFCs etc	not at present	mainly no	yes
surface ozone	yes	no	yes

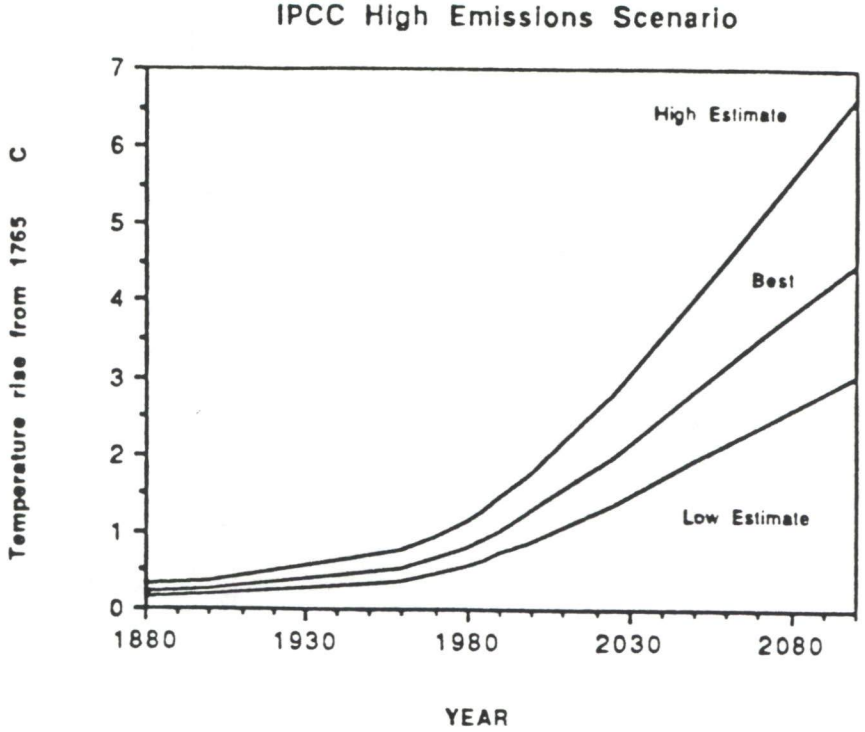
How much do we expect climate to change?

Computer-based numerical models are the best tools we have for making climate predictions; a description of their main features, and how much confidence we can place in their results, are given in the boxes. We outline below the predictions they make for changes at a global and sub-global level.

To estimate the change in climate, we need to know what emissions of greenhouse gases will be over the next decades; in the predictions below we assume the **High Emissions scenario** developed by IPCC Working Group 3. The concentrations and radiative forcing derived from this emissions scenario were shown earlier.

How quickly will global climate change ?

Using this emissions scenario we estimate that, by the year 2020, the increase in global mean temperatures due to man-made greenhouse gas emissions will be 1.8 C above pre-industrial, with a probable range between 1.3 and 2.5 C. By the year 2070, the range is 2.4 to 5.1 C with a best estimate of 3.5 C. The best-estimate projection out to the year 2100 is shown in the diagram below.



The global warming will also lead, on average, to increased precipitation and evaporation; perhaps by 3% and 7% by the years 2020 and 2070. Not surprisingly, we expect areas of sea-ice and snow to diminish.

There will be large variations in the magnitude of the warming, and those in precipitation will be even greater, with substantial areas of decreased precipitatipn within an overall global increase.

What will be the patterns of climate change by about 2020?

Knowledge of the global mean warming and change in precipitation is of limited use in determining the impacts of climate change, for instance, on agriculture. To do this we need to know what these changes will be at a smaller scale. Our best models predict that surface air over land warm faster than that over oceans; the northern hemisphere will warm faster than the southern, and a minimum of warming will occur around Antarctica and in the North Atlantic region.

There are some continental scale changes in which we have relatively high confidence because they are consistently predicted by the most comprehensive models and because we understand the physical reasons for them. The warming is predicted to be 50-100% greater than the global mean in high northern latitudes in winter, and substantially smaller than the global mean in regions of sea ice in summer. Precipitation is predicted to increase in middle and high latitude continents in winter (by some 5 - 10% over 35-55 N).

In the box below are given the changes in temperature, precipitation and soil moisture, which are predicted to occur by 2020, averaged over the 5 regions (each of which are a few million square kilometres in area) selected by IPCC. There may be considerable variations within the regions. In general, confidence in these

regional estimates is low, especially for the changes in precipitation and soil moisture, but they are examples of our best estimates. We cannot yet give reliable regional predictions at the smaller scales demanded for impacts assessments.

CURRENT BEST ESTIMATES FOR CHANGES BY 2020
(IPCC High Emissions scenario; changes from pre-industrial)

Central North America (35 -55N, 85 -105W)

The warming ranges between 3 and 4 ^{C} in winter and 2 to 3 ^{C} in summer. Precipitation increases range from 0 to 20% in winter whereas there are deceases of 5 to 10% in summer. Soil moisture decreases in summer by 10 to 15%.

South East Asia (5 -30N, 70 -102 E)

The warming ranges from 1 to 2 ^{C} throughout the year. Precipitation changes little in winter and generally increases throughout the region by 5 to 15% in summer. Summer soil moisture increases by 5 to 10%.

Sahel (10 - 20 N, 20 -38 E)

The warming ranges from 1 to 2 ^{o}C. Area mean precipitation increases and area mean soil moisture decrease marginally in summer. However there are areas of both increase in and decrease in both parameters throughout the region which differ from model to model.

Southern Europe. (35 - 50 N, 10 W - 45 E)

The warming is about 2 ^{o}C in winter and varies from 2 to 3 ^{o}C in summer. There is some indication of increased precipitation in winter, but summer precipitation decreases by 5 to 15%, and summer soil moisture by 10 to 25%.

Australia (12 - 43 S, 115 - 154 E)

The warming ranges from 1 to 2 ^{o} in summer and is about 2 ^{o}C in winter. Summer precipitation increases by around 10% , but there the models do not produce consistent estimates of the changes in soil moisture. There are large variations at the sub-continental level within this area.

How will climate extremes and extreme events change?

Changes in the variability of weather and the frequency of extremes will generally have more impact than changes in the mean climate at a place. With the possible exception of an increase in the number of intense showers, there is no evidence from our work so far that weather variability will change in the future. However, with no change in variability, even for a modest change in the mean, the number of days with temperatures above a given value at the high end of the distribution will increase substantially. Similarly, there will be a decrease in days with temperatures

at the low end of the distribution. So the number of very hot days or frosty nights will be substantially changed without any change in the variability of the weather.Changes in the number of days with a minimum threshold amount of soil moisture (for viability of a certain crop, for example) would be even more acute.

Will storms increase in a warmer world?

Storms can have a major impact on society. Will their frequency, intensity or location increase in a warmer world?

Tropical storms, such as typhoons and hurricanes, only develop at present over seas that are warmer than about 26°C. As the area of sea having temperatures over this critical value will increase as the globe warms, the potential certainly exists for there to be a wider area available for storm development. However, the vertical structure of the atmosphere may also change, and offset this increase. Climate models give no clear indication whether tropical storms will increase or decrease in frequency or intensity as greenhouse gases increase; neither is there any evidence that this has occurred over the past few decades.

Mid-latitude storms, such as those which track across the North Atlantic, are driven by the equator-to-pole temperature contrast. As this contrast will probably be weakened in a warmer world (at least in the northern hemisphere), it could be argued that mid-latitude storms will also weaken. But higher in the atmosphere the thermal contrast strengthens, and it addition the increased amount of water vapour in the atmosphere can supply extra energy to storm development. We do not know which of these factors will be the more influential, and how storms will change in frequency or intensity. Even if changes of this sort do not occur, the tracks they take might move and affect new regions; again, we have no evidence of where, or if, this would happen.

What tools do we use to predict future climate ?

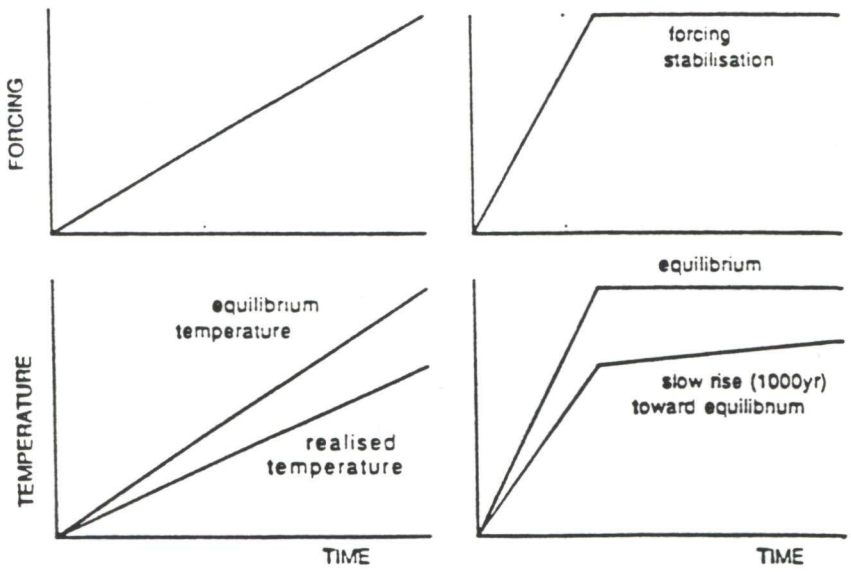
It is relatively easy to predict the direct effect of the radiative forcing due to increases in greenhouse gases. However, as climate begins to warm , various processes act to amplify (through positive feedbacks) or reduce (negative feedbacks) the warming. The feedbacks are due to changes in water vapour, sea-ice, clouds and the oceans. In making a climate forecast, all these processes have to be taken into account. These are described in three-dimensional mathematical model of the atmosphere and ocean (often known as a **general circulation model or GCM**). These are based on the equations of motion and use descriptions in simple physical terms (called parameterisations) of the smaller scale processes such as those due to clouds and to deep mixing in the ocean. (The atmospheric component of a climate model is essentially the same as a weather prediction model).

Equilibrium and realised climate change

We have explained that increases in greenhouse gases will (instantaneously) increase radiative forcing. However, the full warming will not occur instantaneously , because of the effect of the oceans. Firstly, the mixed layer of the ocean (about 100m deep) will have to warm at about the same rate as the atmosphere, because transfer of heat from one to the other takes place very efficiently; this will take typically 10 years. Secondly, there are two areas of the oceans (the northern North Atlantic and the Antarctic ocean) where circulation patterns act to draw down water from the warm upper layers into the very deep ocean. Some of the heat from the upper layers is therefore also drawn into the deep ocean, where it remains for a very long time - upwards of a thousand years; on the century timescale we are considering here, the heat is effectively lost.

Consider the case where continuing increases in greenhouse gases is giving a steady increase in radiative forcing at a rate of about 1% per year - this is roughly what is happening at the moment. The first diagram below shows the **equilibrium** temperature rise which would ultimately occur due to this forcing - this is also the temperature we would experience straight away if there were no oceans. The lower line shows our best estimate of the **realised** temperature rise; the temperature trend that (in the absence of other forcing and variability) we would observe. The realised temperature trend approximates to the eventual temperature trend reduced (mainly because of the heat sequestered into the deep ocean) by about a third.

The concept of the **equilibrium** temperature can best be illustrated (as in the second diagram below) by the artificial case of halting and stabilising the radiative forcing at a future date (remembering that this would require a very large reduction in emissions). The realised temperature would then rise slightly over a ten year period as the ocean mixing layer "catches up" with the atmosphere, but then rise further only very slowly, to meet the equilibrium temperature in over a thousand years.



The long term change in **surface air temperature** following from a doubling of carbon dioxide (generally used as a benchmark and referred to as the **climate sensitivity**) is most likely to be somewhere between 1.5 and 4.5°C, with a most likely estimate of 2.5°C. The lowest result from all models so far is about 1.5°C and, although some models give figures higher than 4.5°C (up to 5.2°C), there are good reasons to believe that the less detailed representation of cloud processes in these models leads to an over-estimation of the warming. This range of climate sensitivity deduced from mathematical models is consistent with empirical evidence from paleo epochs.

How do we forecast climate ?

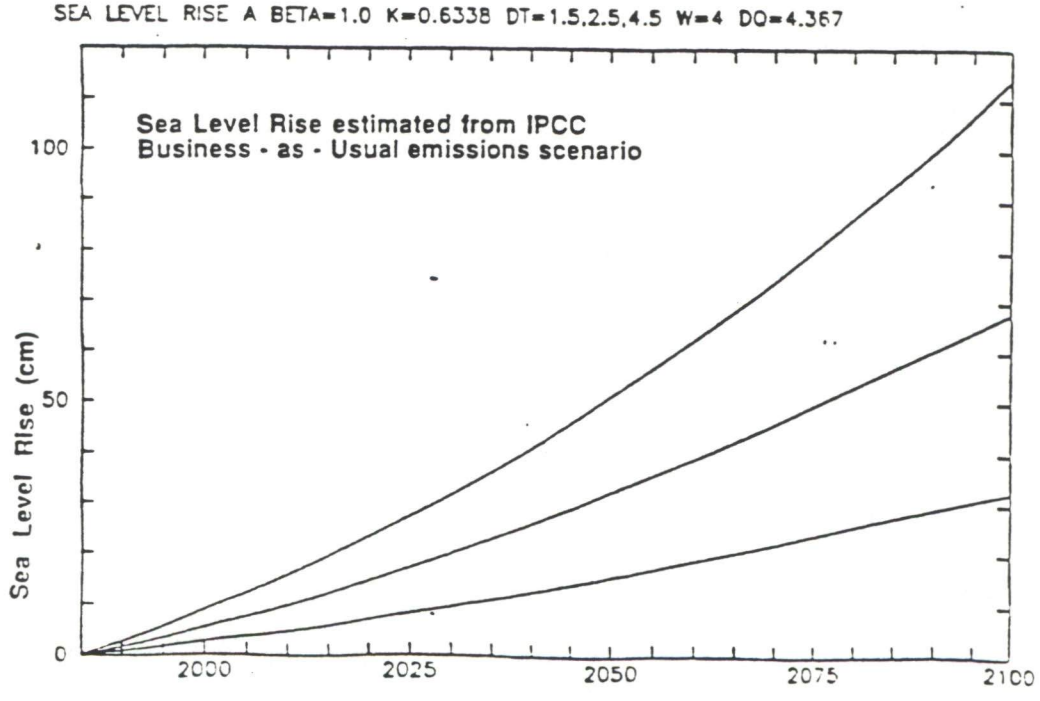
Climate forecasts are derived in a different way from weather forecasts. A weather prediction model gives a description of the atmosphere's state up to 10 days or so ahead, starting from a detailed description of an initial state of the atmosphere at a given time. Such forecasts describe the movement and development of large weather systems, though they cannot represent very small scale phenomena; for example, individual shower clouds.

To make a climate forecast, the climate model is first run for a few (simulated) decades. The statistics of the model's output will be a description of the model's simulated climate which, if the model is a good one, will bear a close resemblance to the climate of the real atmosphere and ocean. The above exercise is then repeated with increasing concentrations of the greenhouse gases in the model. The differences between the statistics of the two simulations (for example in mean temperature and interannual variability) provide an estimate of the accompanying climate change.

A completely different, and potentially powerful, way of predicting patterns of future climate is to search for periods in the past when the global mean temperatures were similar to those we expect in future, and then use the past spatial patterns as **analogs** of those which will arise in the future. For a good analog, it is also necessary for the forcing factors (eg. greenhouse gases, orbital variations) and other conditions (e.g. ice cover, topography, etc.) to be similar; direct comparisons with climate situations for which these conditions do not apply cannot be easily interpreted. So far, analogs of future greenhouse-gas-changed climates have not been found. We cannot therefore advocate the use of paleo climates as predictions of regional climate change due to future increases in greenhouse gases.

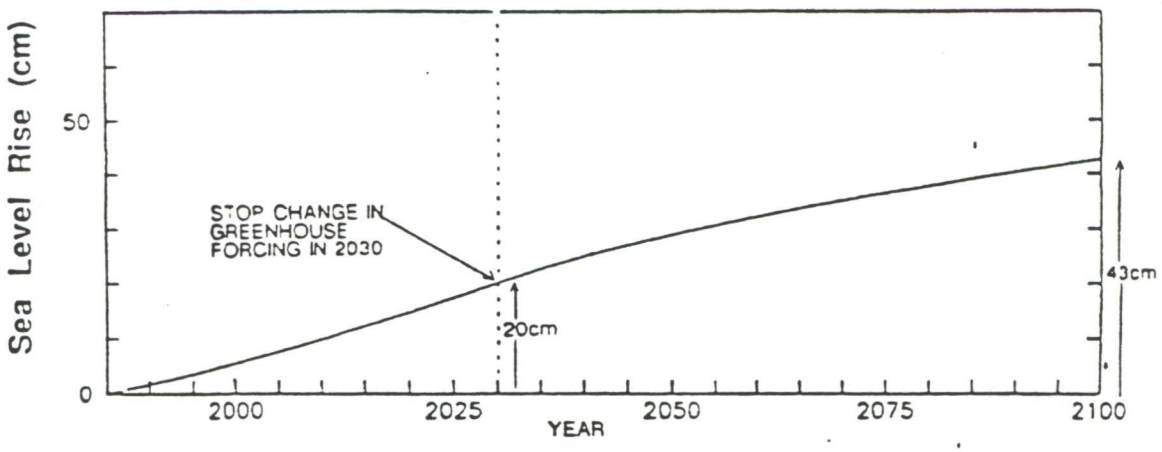
How much will sea level rise ?

Simple models were used to calculate sea level rise to the year 2100 AD; the results are illustrated below. The calculations necessarily ignore any long-term changes, unrelated to greenhouse forcing, that may be occurring but cannot be detected from the present data on land ice and the ocean. For the IPCC High Emissions scenario, sea level is expected to be between 10 cm and 32 cm higher than today by the year 2030, with a best-estimate of 20 cm.



The best estimate is made up of positive contributions from thermal expansion of the oceans (12cm); melting of glaciers (8cm) and the Greenland ice sheet (1cm), with a 1cm negative contribution from Antarctica due to higher ice/snow accumulation in a slightly warmer climate. By the year 2070, sea level is expected to be 45cm higher, with a range of 33cm to 75cm.

By 2030, even if greenhouse forcing increased no further, the world would still be committed to a continuing sea level rise for many decades and even centuries, due to delays in climate, ocean and ice mass responses (see figure below). Sea level would go on rising from 2030 to 2100, by a further 23cm, due to the effects of pre-2030 greenhouse gas increases alone. Moreover, in the longer term, irreversible changes could be triggered with long-lasting effects. For instance, for a persistent 4°C warming, the major part of the Greenland ice sheet would eventually disappear (but over thousands of years), and would not reform even with a return to the present climatic conditions.



SEA LEVEL RISE COMMITMENT. Even if greenhouse gas concentrations were stabilised in 2030, sea level would continue to rise steadily

The West Antarctic Ice Sheet (WAIS) is of special concern, as a large portion of it is grounded far below sea level and it contains an amount of ice equivalent to 5m of global sea level. Recent studies have demonstrated that individual ice streams are changing rapidly on a decadal to century time scale. This variability is not necessarily related to climate, but is important for future sea level change. Within the next century, it is not likely that there will be a major outflow of WAIS ice due directly to greenhouse warming.

Regional rise in sea level is expected to differ substantially from the global mean value. Thermal expansion, changes in ocean circulation, and surface air pressure will vary from region to region as the world warms, but in a yet unknown way. Such regional details await further development of realistic physical models of the ocean circulation. In addition, vertical land movements can be as large or even larger than changes in global mean sea level. For estimates of regional sea level rise, these should be added to climate-related changes in ocean volume.

How much confidence do we have in our predictions?

Uncertainties in the predictions above arise from a number of sources. Firstly, it is obvious that future climate change will depend on the rate at which greenhouse gases (and other gases which influence them) are emitted; this in turn will be determined by various complex economic and sociological factors. Scenarios of future emissions were generated within IPCC by Working Group 3; four such scenarios are explored in the main report, and one of these (corresponding to a Business - as- Usual case) is used to illustrate this Summary.

Secondly, because we do not fully understand the sources and sinks of the greenhouse gases, there are uncertainties in our calculations of future concentrations arising from a given emissions scenario. For carbon dioxide, for example, the concentration calculated for 2070 from the Business-as-Usual emissions scenario ranged from 560ppmv to 720ppmv; we have chosen a best estimate for each gas. Furthermore, because natural sources and sinks of greenhouse gases are sensitive to a change in climate, they may substantially modify future concentrations; ice core records show that methane and carbon dioxide concentrations changed in the same way as temperature between ice ages and interglacials. For example, if wetlands become warmer, methane emissions (and hence concentrations) will increase; if they become drier, methane emissions will decrease. Although these factors are complex, it appears that they are more likely to increase greenhouse gas abundances overall and hence increase the climate change estimates given above.

Thirdly, although we understand quite well the forcing due to changing gas concentrations, other factors apart from these can influence climate. Those which could be important on a decadal timescale are: short term variability of **solar** radiation output; aerosols from a large **volcanic** eruption and low level aerosols arising from **man-made sulphur** emissions. On the timescale of the next century, however, the change in climate due to increasing greenhouse gases is likely to be far more important than that from these other effects.

Because of long period couplings between ocean and atmosphere the earth's climate would still vary without being perturbed by any external influences. This **natural variability** could act to speed up, or slow down, any man-made warming but on a century timescale would be less than greenhouse gas-induced changes.

Fourthly, models are only as good as our understanding of the processes which affect climate, and this is far from perfect. The range in the climate predictions given above reflects an estimate of uncertainties due to model imperfections; the largest of these is cloud feedback, leading to a factor of two uncertainty in the size of the warming. Neverthless, for reasons given in the box below, we have substantial confidence that models can predict at least the broad scale features of climate change.

Confidence in predictions from climate models

What confidence can we have that climate change will look anything like what the models tell us? Weather forecasts can be compared with the actual weather the next day and their skill assessed; we cannot do that with climate predictions. There are several indicators that give us some confidence in the predictions from climate models.

When they are run with the present amount of carbon dioxide in the atmosphere their simulation of present climate is generally realistic, capturing the major features such as the wet tropical convergence zones and mid-latitude depression belts, as well as the contrasts between summer and winter circulations. The models also simulate the observed variability; for example, the large day-to-day pressure variations in the middle latitude depression belts and the maxima in interannual variability responsible for the very different character of one winter from another both being represented.

Overall confidence is increased by their generally satisfactory portrayal of aspects of variability of the atmosphere such as that associated with El Niño (the irregular warming of the Eastern tropical Pacific).

In addition, when forced with correct conditions (solar radiation, greenhouse gas forcing, ice caps,etc) they can capture important features of climates 6,000 to 9,000 years ago and the most recent ice age about 20,000 years ago.

It is also worth noting that the weather forecasting models (from which climate models have been developed) predict weather for several days ahead, with generally great success.

Will the predicted changes be unusual?

When considering future climate change, it is clearly essential to look at the record of climate variation in the past. From this record we can learn about the range of natural climate variability, to see how it compares with what we expect in the future, and also look for evidence of recent climate change due to man's activities.

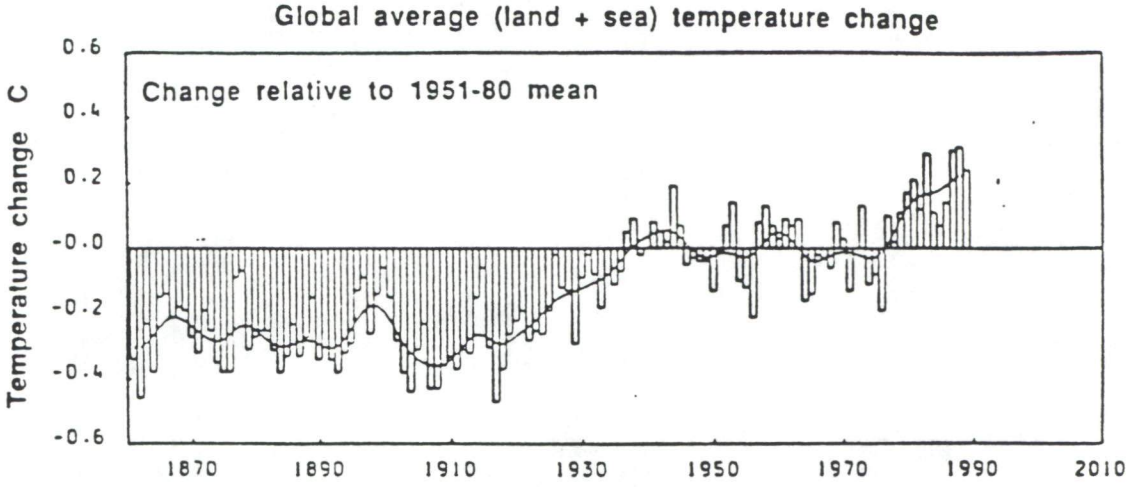
Climate varies naturally on all time scales from hundreds of millions of years down to the year to year. Prominent in the earth's history have been the 100,000 year glacial-interglacial cycles when climate was mostly cooler than at present. Global surface temperatures have typically varied by 5 to 7°C through these cycles, with large changes in ice volume and sea level, and temperature changes as great as 10-15°C in some middle and high latitude regions of the northern hemisphere. Since the end of the last ice age, about 10,000 years ago, global surface temperatures have probably fluctuated by little more than 1°C. Some fluctuations have lasted several centuries, including the Little Ice Age which ended in the nineteenth century and which appears to have been global in extent.

The changes predicted to occur by about 2040 due to man made increases in greenhouse gas concentrations will make global mean temperatures higher than they have been in the last 100,000 years.

Has man already begun to change the global climate?

The instrumental record of **surface temperature** is fragmentary until the mid nineteenth century, after which it slowly improves. Because of different methods of measurement, historical records have to be harmonised with modern ones, introducing some uncertainty. Despite these problems we believe that a real warming of the globe of 0.3 C - 0.6 C has taken place over the last century.

Moreover since 1900 similar temperature increases are seen in three independent data sets: one collected over land and two over the oceans. The figure below shows current estimates of smoothed global mean surface temperature over land and ocean since 1860.



Although overall temperature rise has been broadly similar in both hemispheres, it has not been steady, and differences in their rates of warming have sometimes persisted for decades. Much of the warming since 1900 has been concentrated in two periods, the first between about 1920 and 1940 and the other since 1975. The northern hemisphere cooled between the 1940s and the early 1970s when southern hemisphere temperatures stayed nearly constant. The pattern of global warming since 1975 has been uneven with some regions, mainly in the northern hemisphere, continuing to cool until recently. This regional diversity indicates that future regional temperature changes are likely to differ considerably from a global average.

That there has been a real temperature rise is strongly supported by the retreat of most **mountain glaciers** of the world since the end of the nineteenth century and the fact that **sea level** has risen over the same period by an average of 1 to 2 mm per year.

Estimates of thermal expansion of the oceans, and of increased melting of mountain glaciers and the ice margin in West Greenland over the last century, shows that the major part of the rise appears to be related to the observed global warming.This apparent connection between observed sea level rise and global warming provides grounds for believing that future warming will lead to an acceleration in sea level rise.

The magnitude of the warming over the last century is broadly consistent with the theoretical predictions of climate models. If the sole cause of the observed warming were the man-made greenhouse effect, then the implied climate sensitivity would be in the lower half of the range inferred from the models. However, the range of natural variability is almost certainly as large as any change to date due to the man-made greenhouse effect.

Global-mean temperature alone is an inadequate indicator of greenhouse-gas-induced climatic change. Identifying the causes of any global-mean temperature change requires examination of other aspects of the changing climate, particularly its spatial and temporal characteristics - the man-made climate change "signal". However, we do not yet know what the "signal" looks like because, as we have seen, prediction of many of these detailed characteristics is not yet possible;.

Although we are convinced of the reality of an increasing anthropogenic greenhouse effect, by the time unequivocal detection has been achieved, the commitment to future climate change will be considerably larger than it is today.

What will be the effect of climate change on ecosystems ?

Our life support system depends on the basic functioning of our ecosystems. Photosynthesis captures atmospheric carbon dioxide and solar energy and stores them in organic compounds which are then utilized for subsequent plant growth, the growth of animals or the growth of microbes in the soil which release CO_2 via respiration into the atmosphere.

The rates of ecosystem processes are dependent on climatic factors in the short term and carbon dioxide concentration may also modify the rates of photosynthesis and respiration. In the longer term, climate and atmospheric carbon dioxide control the structure of ecosystems by selecting species which together function within them. Changes in climate and atmospheric carbon dioxide concentrations will, therefore, modify both function and structure in our ecosystems.

Photosynthesis fixes 120-160 Gt of carbon each year (90-120Gt on land and 30-40 Gt in the oceans). Most land plants have a system of photosynthesis which will respond positively to increased atmospheric carbon dioxide ("the carbon dioxide fertilization effect"), but the response varies with species and may decrease with time. The response to increased carbon dioxide results in greater efficiencies of water and nitrogen use and may be particularly important in plants of stressed ecosystems (in arid/semi arid and infertile areas). Photosynthesis will also increase as temperature and moisture increase and as nutrient availability increases through the stimulation of the decomposition process by increased temperatures.

So far there is no incontravertible proof that net terrestrial ecosystem production has increased. If there were, it would be almost impossible to apportion this between land use effects, fertilization by atmospheric pollutants and climate change. The extent to which ecosystems can sequester increasing atmospheric carbon remains to be quantified.

As various species respond differently to various components of the physical environment, some species in a particular location will be more advantaged than others by global change. They will then displace other species and communities and ecosystems will change in structure. Displaced species will be forced to higher latitudes and altitudes, and will be prone to extinction, having no potential habitat while existing where change is predicted to be greatest. Communities will not move en bloc and new assemblages of species will form at new locations. However, a major constraint on the movement of species will be their potential migration rates which will almost always be less than the rates projected for climate change. The result is likely to be unstable ecosystems prone to extensive damage by exceptional events such as drought and fire.

Deforestation and Reforestation

Man has been deforesting the Earth for millennia since the development of shifting cultivation. During the early part of the century this was mainly in temperate regions, more recently it has been concentrated in the tropics. Deforestation has three potential impacts on climate: through the carbon and nitrogen cycles (where it can lead to changes in carbon dioxide concentrations); through the change in reflectivity of terrain when forests are cleared, and through their effect on the hydrological cycle (precipitation and evaporation).

The destruction of 100,000 square km of tropical forest has been estimated to release up to 2 Gt of carbon (GtC) to the atmosphere, though allowing for replacement by grassland suggests that nearer 1 GtC is a likely figure. If all the tropical forests were removed, the input is variously estimated at from 150 to 350 GtC; this would increase atmospheric carbon dioxide by 35 to 80 ppmv . The rate of loss of forest is difficult to estimate; probably till the mid-20th century, deforestation was a more important contributor to atmospheric carbon dioxide than was the burning of fossil fuels. Since then, fossil fuels have become dominant; one estimate is that around 1980 1.7 GtC was being released annually from the clearing of tropical forests, compared with 5 GtC from burning of fossil fuels. Carbon dioxide will be absorbed from the atmosphere during the growth, phase of new forests; it is estimated that the planting of 4 million square kilometres of temperate forest would withdraw about 1Gt of carbon from the atmosphere per year for over 100 years.

Deforestation can also alter climate directly by decreasing the absorption of solar radiation, so weakening the local heat source and decreasing rainfall. Experiments with climate models predict that replacing all the forests of the Amazon basin by grassland reduces the rainfall over the basin by about 20%.

How can we limit climate change?

From studies of how quickly ecosytems can adapt to climate change, it may be relevant to assess what maximum emissions of greenhouse gases would result in global temperatures changing by, say, 0.1°C or 0.2°C per decade.

Even if we were able to stabilise atmospheric concentrations of the greenhouse gases at present day levels (requiring, as we saw above, cutbacks in emissions of 50 - 80% in most gases), this would still not keep climate as it is today; we may already be committed to a global rate of change of about 0.1 C per decade. To limit global temperature increase to about 0.2 C per decade, emissions of carbon dioxide would have to be reduced by about XX% (calculation to be finalised), making reasonable assumptions about the effect on CFCs of the Montreal Protocol, and assuming emissions of other gases remain unchanged.

What should be done to reduce uncertainties, and how long will this take ?

Policymakers will be aware from this assessment that, although we can say that significant climate change is unavoidable, much uncertainty exists in prediction of global climate properties such as the temperature and rainfall near the surface and the mean sea level. Even greater uncertainty exists in predictions of regional climate change.

To reduce these uncertainties large improvements are required in our capability to model and to observe the global climate system, and to understand it through studies of the processes that need to be represented in the global models. As far as the global modelling is concerned, it is particularly urgent to develop coupled atmosphere -ocean-ice models with increased spatial resolution, incorporating more realistic formulations of relevant physical, chemical and biological processes.

As far as the processes are concerned, the main areas of uncertainty are (1) the role of the clouds which lead to feedback that may amplify or limit the response of the atmosphere to greenhouse forcing, (2) the changes that can occur in the world ocean circulation and in the heat intake of the ocean which acts to reduce and delay surface warming, and (3) the changes that will modify biological activity on land and in the seas. Detailed field studies of these processes are either planned or underway.

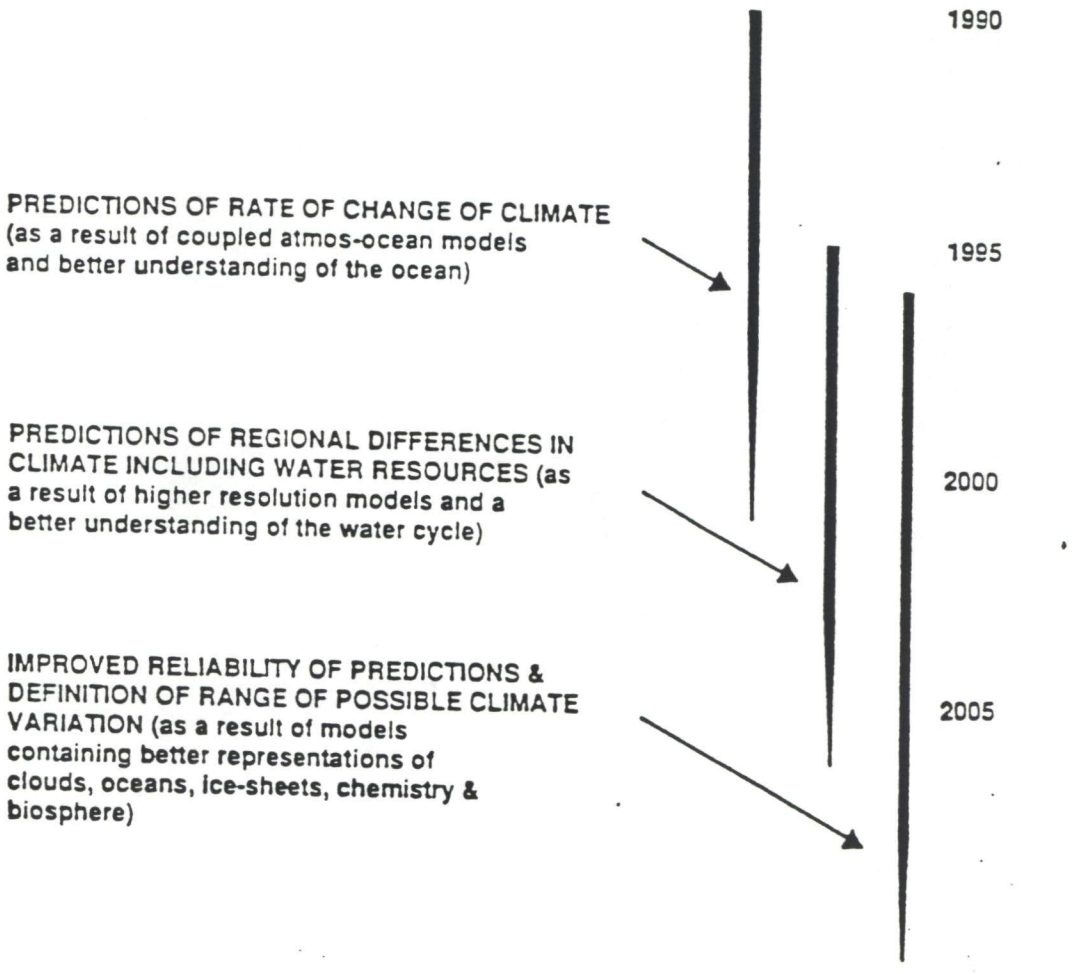
As far as the global observational capability is concerned there needs to be increased accuracy and coverage in the observations of the properties of the atmosphere and oceans, especially those directed to the earlier possible detection of climate changes and towards the verification of climate models. The main observational requirements are (1) the maintenance and improvement of observations provided by the World Weather Watch programme of WMO, (2) the development of major new satellite observing systems to obtain global description of properties such as three dimensional cloud distribution and rainfall from polar orbiting platforms, and three dimensional wind fields from a low altitude satellite covering tropical regions, and (3) a new initiative to establish measurements from ships and automatic instrumented vehicles, deep sea moorings and shore stations.

International cooperation to carry out all aspects of this work is concentrated in the World Climate Research Programme and the International Geosphere-Biosphere Programme. These are large and complex endeavours - the largest coordinated international scientific programmes yet attempted. To reinforce existing projects and tackle new scientific problems not only will increased resources be necessary to support existing research teams in each nation, but an increased supply of trained scientists will also be essential; this has implications now at all levels of education. The international community of scientists also needs to be widened to include more participants from developing countries.

As research advances, increased understanding and improved observations will lead to progressively more reliable climate predictions. However considering the complex nature of the problem and the scale of the scientific programmes to be undertaken we know that rapid results cannot be expected. Indeed further scientific

advances may expose unforseen problems and areas of ignorance. Surprises are possible; for instance it is worth noting that the "ozone hole" resulting from the effects of CFCs was entirely unpredicted. The box below gives some important milestones towards narrowing the uncertainties.

TIMESCALES FOR NARROWING UNCERTAINTIES



COUNCIL OF ECONOMIC ADVISERS
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON

MEMBER OF THE COUNCIL

February 9, 1990

MEMORANDUM FOR DPC TASK FORCE ON ECONOMICS OF GLOBAL CHANGE

FROM: RICHARD SCHMALENSEE

SUBJECT: "Insert 9"

As promised, we discussed the "insert 9" issue -- the last outstanding substantive issue in the whole report -- with Bob Corell. He agreed that some balancing of the cloud feedback discussion was appropriate to indicate that the relevant uncertainty was two-sided, but he was not comfortable with the draft insert. The alternative language he gave us appears in the paragraph beginning on the bottom of the first of the two attached pages. If you have problems with this paragraph, please call me by noon on Monday, February 12. If you call, please have in mind a plan of action to get closure on this issue by COB Monday. If nobody calls, the paragraph goes as it stands.

We have finally surfaced from the Economic Report of the President and Clean Air negotiations long enough to prepare a draft that embodies all changes agreed to. The final report will go out our door as soon as a final editorial scrub is completed (this weekend, we hope) and the "insert 9" issue is settled.

As in the case of methane, most N_2O emissions are associated with agricultural activity and with developing nations. Increased fertilizer use has both raised N_2O emissions and dramatically increased food supplies in many developing nations. The U.S. share of world N_2O emissions is only about 14 percent and is expected to fall below 10 percent by mid-century.

B. Potential Climate Changes

Formulating a realistic and responsible outlook on possible climate effects associated with increasing atmospheric greenhouse gas concentrations requires providing answers to a sequence of increasingly complex questions.

1. Uncertainties. It is first necessary to project future emissions of greenhouse gases. As noted above, such projections are inevitably uncertain. It is then necessary to predict how much of the assumed emissions will remain in the atmosphere after accounting for the effects of natural processes. Most tentative scenarios, like those above, project that emissions will be sufficient to result in the radiative equivalent of a doubling of atmospheric carbon dioxide (the combined effects of CO_2 and other trace gas increases) between 2030 and 2070.

Once the greenhouse gas levels in the atmosphere are projected, the next step is to project associated changes in heating of the earth system as a whole. An increase in radiative forcing by greenhouse gases does not necessarily imply a significant warming of the planet. For instance, it has been argued that a strong negative cloud feedback mechanism could counter the effects of greenhouse gas buildup. In this case little net warming of the system would take place. A recent study found that using a different representation of clouds in a climate model reduces the predicted global warming by a factor of two to three. However, the best climate models available today indicate that increased greenhouse gas concentrations will lead

to some warming of the overall earth system. Because potentially important positive and negative feedbacks which have not been adequately modeled are known to exist, the questions of whether a systematic warming will take place, and its magnitude, must still be considered as open.

The next question is more subtle and complex: To what extent will a warming of the earth system be manifested in actual surface temperature change? The role of the ocean as a heat sink illustrates this issue well. Recent computations with one of the world's leading coupled ocean/atmosphere models indicate that a one percent per year carbon dioxide buildup (doubling by 2040; redoubling by 2120) would produce for the Northern hemisphere a warming of 2°C at the equator by 2050, increasing to around 4°C at high latitudes. But in this computation, the high Southern latitudes hardly warm at all because the high latitude southern ocean absorbs virtually all the heat from greenhouse warming (ocean temperatures actually increase slightly). Under this model, the earth system would clearly warm, but surface temperatures would scarcely be affected in the Southern Hemisphere. The particular configuration of the ocean, atmosphere and land surface in the Southern Hemisphere is responsible for this asymmetry. More generally, observed surface temperature increases are likely to remain less than equilibrium temperature increases (those that would eventually occur with given atmospheric concentrations of greenhouse gases) for decades or even centuries.

While considerable advances have been made in climate models, it is important to note that model simulations of global warming are not consistent with the historical record, itself the subject of considerable debate. The available models predict an increase in global surface temperature with increasing greenhouse gases, but analyses of land and sea surface temperature changes over the past century generally fail to detect such a pattern. On the other hand, our ignorance is a two-edged sword; some

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THE WHITE HOUSE

WASHINGTON

February 9, 1990

MEMORANDUM FOR MEMBERS OF THE DPC WORKING GROUP ON GLOBAL CHANGE

FROM: D. ALLAN BROMLEY

SUBJECT: UPDATE ON PLANS FOR THE 1990 WHITE HOUSE CONFERENCE ON SCIENCE AND ECONOMICS RESEARCH RELATING TO GLOBAL CHANGE

The DPC Working Group on Global Change, at its meeting on Tuesday, January 30, 1990, made several decisions with regard to the President's meeting on Science and Economics Research Relating to Global Change.

1) It was agreed that the meeting will be held on Wednesday and Thursday, April 18-19, 1990 in Washington, D.C. Subsequent discussions require that these dates be changed to April 17-18 in order to make available the new Georgetown University Leavey Conference Center and Quest House (where the IPCC meeting was held this week).

2) It was agreed that the criteria for the invitations would be those countries that "because of their land masses, large populations or heavy future energy needs, will be compelled to deal with environmental problems having a global magnitude and impact," and those countries that have the scientific and technology capabilities to address the substantive questions of global change. The list of invitee countries was endorsed and is:

> The G-7 nations, Australia, Brazil, China, India, Mexico, Nigeria (or another African nation, the Soviet Union, Zaire, Netherlands, Norway, the European Community, and the Organization for Economic Cooperation and Development (OECD). We have, for a whole series of good reasons, added Zaire, Norway and the Netherlands to the earlier list.

3) It was decided that the President's invitation to the Heads of State of those nations should be sent out ASAP.

4) It was decided that the DPC Working Group would meet in two or three weeks to review progress, including matters such as the agenda for the meeting, schedule of "things-to-do" during the next two and a half months, (PERT chart) and logistics.

To facilitate the next DPC Working Group meeting on the Conference, we will prepare a Concept Paper on the Conference which details:

1) Concepts and expectations for the meeting:

   - o The rationale and purposes of hosting the meeting, i.e., why is the President hosting this meeting and what do we expect to accomplish by having the meeting?

   - o What is the proposed agenda and schedule of events for the meeting, and what is the rationale behind the elements included in the agenda?

   - o What are the expected outcomes and products from the meeting?

2) An initial outline of arrangements and logistics for the meeting.

3) A schedule for the decisions, arrangements, logistics, etc. for the meeting, probably through Gantt and PERT charts.

4) An outline of the budget and financial considerations for the meeting.

5) Specific action items on which the DPC Working Group agreements and endorsements are requested.

If there are questions, comments, needs for information concerning the conference, please contact Bob Corell at 357-9715, or by FAX at 357-9629, or through the OMNET Telemail System at R. CORELL.

cc: Gov. Sununu

MEMORANDUM

COUNCIL OF ECONOMIC ADVISERS

February 13, 1990

TO: MICHAEL BOSKIN
STEPHEN DANZANSKY

FROM: DICK SCHMALENSEE

SUBJECT: Toward an Administration strategy on global warming

At one time or another I have promised both of you a few thoughts on this subject. Hence this note, which argues for developing an explicit strategy on global warming -- a set of principles that will inform the many tactical/operating decisions to be made in coming months -- and offers some thoughts on the elements of such a strategy. My apologies for its length; if I had had more time, I would have written less.

Why do we need an Administration strategy? The main reason is that this issue is hot: it is on the minds of the public, and the Administration will be required to make a host of decisions on it in the domestic and international arenas in coming months. (Action-forcing events include the April conference, future IPCC and other international meetings, likely Congressional initiatives, and a host of agency proposals of the CAFE and tree-planting varieties.) Without a strategy, each of these decisions will involve a struggle between those with differing views on appropriate general policy.

In addition, many members of the Administration will be called upon to talk about global warming in coming months. Without a clear strategy, speeches by different people are likely to point in somewhat different directions.

If we do not formulate an Administration strategy, we thus will experience slow and difficult decision-making, more bad press, and growing intra-Administration tensions; and we will produce a set of actions and statements that is unlikely to have any coherence or to advance systematically what anyone considers to be sensible policy objectives. On the other hand, if we can agree (through the DPC or EPC process) on the broad outlines of a sensible policy, we would have some chance of advancing it by our actions and public statements.

What sort of strategy should the Administration adopt? We have made it clear that we are against hasty and expensive action; we need to find an attractive package of things that we are for.

We are now perceived as simply stalling; our implicit strategy is interpreted at home and abroad as "Do nothing until the scientific questions are answered." This is, I think, a loser politically and weak scientifically. Nobody argues that the key scientific questions are likely to be definitively answered in the next 5 years, and the lags involved in acting would not be trivial.

Some thoughts as to what we might be <u>for</u> follow:

- o We must of course continue to stress the high level of scientific uncertainty regarding possible future climate change, our commitment to serious research, and our hope that other nations will help carry this burden.

- o We should begin to make exactly parallel statements in other related research areas:

  - -- On the economic side, the costs of warming and of reducing greenhouse emissions are highly uncertain. Moreover, so little work has been done that it is not unreasonable to expect that the application of existing techniques to available data can reduce this uncertainty substantially over the next 5 years or so, though significant uncertainty will inevitably remain.

  - -- Techniques for abatement of emissions of methane and nitrous oxide have not been much studied, and there is undoubtedly more to be learned about carbon dioxide abatement as well.

  - -- My impression is that there is also good science and engineering to be done in the area of adaptation.

- o Internationally, we should press aggressively, through the IPCC process, for the development of a framework convention that would permit a serious attack on the problem to be mounted at least cost, should such an attack be someday found necessary. This means

  - -- Shifting from "No framework now" to "A sound framework as soon as possible."

  - -- Continuing to stress that the problem is global and involves sources and sinks of many gasses. (The <u>entire</u> U.S. transportation system contributed around 3 percent of human-related greenhouse emissions in the 1980s, for instance, and this share is declining.)

  - -- Marketing our comprehensive/trading approach aggressively for what it is: the way to minimize the costs of serious, global action. While a framework

convention based on this approach may take a year or two longer to negotiate than a framework that merely anticipates a large number of source-specific protocols, it is much more likely to permit serious action, should such action be found necessary.

o We should define the "no-regret" strategy clearly, adopt it explicitly, and move forward visibly to implement it. This means

  -- Making it clear that the "no-regret" strategy means ordering the agenda to take quick action on proposals for which non-greenhouse benefits exceed costs and some greenhouse benefits are expected. If it were to be interpreted as "adopt all policies with both greenhouse and non-greenhouse benefits," the economy would be placed at serious risk -- not to mention the budget.

  -- Proposing international research and technology transfer programs (in which the Japanese have expressed serious interest), probably at the G-7 summit.

    - Research on new energy supply technologies and on methods of reducing greenhouse emissions or enhancing the corresponding sinks is, at the very worst, advancing technology generally and purchasing insurance.

    - If nothing else, raising the energy efficiency of the developing nations will serve to hold down fossil fuel prices on world markets.

  -- Moving quickly to implement the no-regret strategy domestically. There are a variety of candidate actions here; these include

    - Issuing an Executive Order requiring Federal Facilities to identify possibilities for reducing emissions -- particularly by improving efficiency.

    - Actively encouraging changes in utility regulation to deal with apparent market failures that serve to limit investments in conservation.

    - Marketing the tree-planting program externally as it was marketed internally -- as a program that has beautification and greenhouse benefits.

    - Considering the imposition of a small carbon fee, which would serve to reduce emissions, raise revenue, and be an important symbolic step.

COUNCIL OF ECONOMIC ADVISERS
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON

MEMBER OF THE COUNCIL

February 13, 1990

MEMORANDUM FOR NANCY MAYNARD, OSTP

FROM: RICHARD SCHMALENSEE

SUBJECT: Economics on the Questionnaire

Here are some quick thoughts on the 2/5/90 meeting notes on the conference questionnaire, organized following those notes. A general comment: the final document should be vetted by the State Department after it has been re-written by somebody who has produced similar documents in the past. We want to avoid giving offense, getting useless answers to badly-posed questions, and posing absurd burdens on respondents and ourselves. We should structure this document so that we can fairly quickly make a useful summary/compilation available for the conference.

1. I would suggest that we provide a broad outline of relevant topics in both science and economics, that we ask for only major projects, and that we ask for short descriptions and for the name and address of a contact person. On the economics side, the outline might be as follows:

    1. Forecasts of future greenhouse gas emissions.

    2. Forecasts of future relevant technologies.

    3. Studies of methods or costs of adapting to warming.

    4. Studies of methods or costs of reducing greenhouse gas emissions.

2. This might be phrased as "What are the scientific and economic questions that it is most important to answer in order to develop domestic and international policies?"

3. This seems to be exactly the same as #2...

4. This is a fairly complete list; what follows is an attempt to put some structure on it.

    o What is your nation's current budget for climate-related scientific and economic research (public and private sectors, if possible)? How does it break down according to the outline [furnished in item #1, above]?

- o In what aspects of climate-related economic and scientific research is your nation particularly strong? What aspects would you particularly like to discuss at the conference?

- o What are your government's estimates of your nation's current and future (through 2010 or 2030) net emissions of the main greenhouse gasses: carbon dioxide, CFCs and related compounds, methane, and nitrous oxide.

  - -- How do these emissions break down among major sources? [use the (EPA) breakdowns in the task force report?]

  - -- What pattern of fuel use is assumed in the carbon dioxide projections?

  - -- How accurately are current net emissions of these gasses measured?

  - -- What are the key uncertainties attached to your estimates of future emissions, and how important are they?

  - -- What research is ongoing to reduce these uncertainties and to improve measurement accuracy?

- o If warming occurs, what are the major economic costs your country expects to incur as a consequence?

  - -- What studies support these estimates?

  - -- What adaptation measures are now under active consideration?

- o If your nation were required to make significant reductions in future net greenhouse emissions, how would you propose to accomplish this?

  - -- What studies support your choice of mitigation strategies?

    - If you have decided not to use incentive-based approaches (charges and/or marketable permits), why not?

    - If you have not considered abatement of gasses other than carbon dioxide, why not?

  - -- How would you anticipate altering (directly or indirectly) your nation's use of fossil fuels to reduce carbon dioxide emissions?

- What role would new technologies play in this process?

- What role would nuclear power play?

-- What cost estimates have you produced for various levels of mitigation?

- How do these costs compare with those imposed on your nation by the oil shocks of the 1970s?

-- What actions, if any, do you plan to take in the near future to limit net greenhouse gas emissions?

- What reductions do you expect them to produce, when, and at what cost?

o What mechanism is your government employing to make decisions regarding possible future climate change?

These are only my own hurried thoughts; Howard and Michael may have useful additions, deletions, or modifications to suggest.

cc: Michael J. Boskin
Howard K. Gruenspecht

DRAFT

DRAFT

December 26, 1989

MEMORANDUM

TO: Hon. D. Allan Bromley
Assistant to the President
for Science and Technology
Chairman, Domestic Policy Council Working Group
on Global Change

C. Boyden Gray
Counsel to the President

Robert E. Grady
Associate Director, Natural Resources, Energy & Science
Office of Management and Budget

FROM: Richard B. Stewart
Assistant Attorney General

SUBJECT: Proposed Executive Order on Global Environmental Change

As requested, we have prepared a draft of an Executive Order that might be issued by the President to direct federal agencies to assess their programs in light of potential global environmental change. This memorandum discusses several salient features of the Draft Executive Order.

This Draft Executive Order has not been circulated for comment by other agencies, and has not received formal approval as to form and legality within the Justice Department. In the past, draft executive orders have received interagency comment before final issue. For example, Executive Order 12630, directing agencies to assess the impacts of their activities on "takings" concerns, was circulated for comment. Coupled with the technical nature and potential burden on agencies of the present draft order, this experience suggests that circulation for interagency comment would be desirable.

1. Purpose and Scope of the Draft Executive Order.

Global environmental change has emerged as a potentially important issue with broad implications for both domestic and international policy. Although the scientific understanding of global environmental phenomena is less than complete and continues to evolve, such phenomena may have sufficient primacy in both expert and public opinion, and their effects may ultimately prove sufficiently significant, to warrant inquiry now into the relationship between federal programs and global environmental change.

Issuance of the attached Executive Order ("EO") would be a proactive measure which would provide a solid and necessary informational base for future policy initiatives. It would also assist the President in taking the initiative on the nation's environmental agenda. At the same time, the attached Draft EO does not direct agencies to change the substance of their programs. Such changes might be made after an informational base is collected under the present Order.

The Draft EO directs a comprehensive analysis of the relationship between Federal Government activities and global environmental change. Each federal agency is required promptly to evaluate its activities, on a programmatic basis, in relation to global environmental change. These evaluations will permit a government-wide inventory of the relationship between government and global environmental change, assist the development of a broad portfolio of possible responses to such change, and identify areas showing the greatest need or promise for innovative future initiatives. In combination, these results may substantially improve our ability to make intelligent policy choices on global environmental change, and our ability to support these choices with informed analysis.

The evaluations ordered by the Draft EO are programmatic, not project-specific. That is, agencies are directed to review their broad programs, not each project separately. This choice is made largely because the science of global environmental phenomena is rarely sufficiently precise to pinpoint the relationship between a specific federal project and global changes. Additionally, a project-specific review could be too time-consuming, and too burdensome, to achieve the pragmatic goals of the Draft EO.

The analysis ordered by the Draft EO is intended to provide information on two aspects of the relationship between federal programs and global environmental change: the potential effects of federal programs on such change, and the impact such change may ultimately have on governmental programs. The first involves federal programs' contributions to the causes of global

environmental change, including programs that affect sources of greenhouse gases and ozone-depleting substances and that affect sinks that remove greenhouse gases from the atmosphere. The second deals with programs potentially vulnerable to global environmental change, such as management of public lands, water supplies, forests, and coastal facilities, and federal construction programs. In addition, the Draft EO directs agencies to identify opportunities for improved policy responses to the problems posed by global environmental change.

The Draft EO contemplates that "lead agencies" -- identified to be the Office of Science and Technology Policy (OSTP) in the White House, the Council on Environmental Quality (CEQ), and the Department of Justice -- will assist the responding agencies in carrying out the terms of the EO. The lead agencies are to issue guidance and provide assistance to the responding agencies. For example, OSTP and/or CEQ would develop scenarios for global environmental change and send these scenarios to the agencies so that all agencies assess their program impacts and vulnerabilities relying on the same idea of what global environmental changes may occur. The Land & Natural Resources Division of the Justice Department might assist responding agencies in determining the extent of their legal authority to develop new programmatic responses to global environmental issues.

The proposed order does not require agencies to evaluate all the effects that private activities -- for example, the agency's regulated community -- may have on global environmental change (or all the effects that global environmental change may have on private activities). Although some private activities may be so directly regulated or supervised by federal agencies that the relationship between those activities and global environmental change is a relevant part of those agencies' reviews of their own programs (e.g., EPA review of regulations, Army Corps of Engineers review of coastal construction practices, or DOE review of development strategies), the EO in its present form does not require that federal agencies evaluate all the indirect effects of their programs on private activities. A requirement that federal agencies study the global environmental implications of all private activities regulated or otherwise influenced by federal programs would be too broad and too burdensome. Consideration should, however, be given to instructing agencies' evaluations under the EO to include certain important categories of directly affected private activities, such as air pollution sources regulated under the Clean Air Act. Such categories might be developed through the process of agency comment on the Draft EO, and could be implemented through the guidance to be issued by the lead agencies under the EO.

The Draft EO defines the term "agency" broadly, to include all executive agencies, including the independent regulatory

agencies and the military services. Special circumstances of certain agencies can be addressed in the guidance to be issued under Section 4 of the Draft EO. For example, guidance might be issued to make clear that responses to the Draft EO are not to reveal classified information, nor to compromise national security interests. (If desired, such concerns could be addressed in the EO itself.)

The Draft EO identifies two main phenomena to be included in the definition of "global environmental change": global climate change due to the "greenhouse effect," and depletion of the stratospheric ozone layer. Provision is made to add other phenomena to this list by appropriate guidance.

2. Relationship of Executive Order and Planned Issuance of NEPA Guidance.

The Council on Environmental Quality ("CEQ") is currently reviewing agency comments on a draft guidance issued by CEQ in June 1989 on the treatment by federal agencies of global climate change issues in reviews required by the National Environmental Policy Act ("NEPA"). The Draft EO we recommend could largely, although not entirely, serve as a substitute for such NEPA guidance, at least in the near term. It is our view that the EO should be issued first, before any NEPA guidance on the subject is issued. NEPA guidance could then be issued, if desired, in a format which complements the EO directives and the guidance to be issued under the EO. In addition, NEPA guidance could be based on the information produced by agencies under the EO.

Meanwhile, our Draft EO incorporates an important advantage of the NEPA guidance route: expert coordination by CEQ. CEQ's advice and direction to agencies will be crucial to the success of the EO. The EO itself leaves open the specific scientific bases for agency evaluations to follow, preferring to refer that question to guidance issued by OSTP in cooperation with CEQ.

A. We recommend adoption of the Draft EO before any NEPA guidance for several reasons.

(i) The EO is a prompt, consolidated, short-term action involving all agencies at once. It will gather information which can be used promptly and compared across agencies. In contrast, NEPA guidance would come into play only as new decisions on programs or large projects are made. The NEPA route is ad hoc, while the EO route is a comprehensive baseline inventory.

(ii) The EO is a Presidential directive, with a proactive stance. NEPA guidance by CEQ is likely to be seen as an agency

interpretation of a Congressional enactment. The results of NEPA guidance will be occasional reports issued by diverse agencies, often under the pressure of litigation. In contrast, the results of the EO will be a set of companion reports, relying on the same scenarios for change and employing the same format, released simultaneously at a predetermined date, and ready for announcement and presentation by the Administration.

(iii) The EO permits the Administration to direct the agency activities and to define the parameters of the evaluations conducted. It does not depend, as NEPA guidance does, on the edicts of a statute designed to serve purposes not entirely matching the goals of the EO, and the case law developed by courts in years of litigation. Nor would the EO be as vulnerable to interpretation by courts, since it is crafted by the Executive Branch for Executive Branch responses and since it expressly provides that it creates no rights enforceable by others. Furthermore, structuring the conduct and content of the evaluations (and managing budgetary resources) can be much more finely tuned and accurately handled by the Administration under an EO than in a NEPA process.

(iv) The EO addresses programs with an eye to identifying prospective areas for improvement, including potential changes in policy and law. Thus, the information collected under the EO could be used as the basis for Administration proposals for administrative, legislative or international action to address the problems of global environmental change. In contrast, assessments performed under NEPA must consider the environmental impacts of the proposed action and its alternatives, but they typically are restricted to relatively narrow range of alternatives and do not consider long-range policy directions.

(v) The EO will address both the effects of government programs on the global environment, and the effects of global environmental change on the conduct of federal programs. There is a serious question whether the latter effect is within the scope of the review required by NEPA, since the NEPA statute refers to assessment of the impacts of federal action on the environment.

(vi) The EO will rely on uniform scenarios for describing global environmental change, and uniform guidelines for conducting evaluations and presenting output, rather than leaving such decisions up to individual agencies and individual judges. Although NEPA guidance could provide standards to help achieve uniform methods and assumptions, it is more likely than the EO to be subject to diverging methods and assumptions.

(vii) The NEPA guidance proposed by CEQ last spring potentially rendered already-completed Environmental Impact Statements legally vulnerable for failure to consider global

change impacts. The EO avoids that question by making review prospective, and by creating no rights enforceable against any project or other agency decision.

B. Although the EO is the logical first step in addressing the relationship of federal programs to global environmental change, there are reasons why some NEPA guidance may still be desirable after the issuance of the EO.

(i) NEPA guidance may be made applicable to future programmatic decisions, enabling periodic update of the same review requested by the EO. The EO itself does not call for future updates.

(ii) Agencies are already beginning to face court challenges arguing that the failure to evaluate the impacts of federal programs on global climate change violates NEPA. See Foundation on Economic Trends v. Watkins, (Civ. No. 89-1483-GHR, D.D.C.) (challenging programs of Departments of Energy, Interior and Agriculture). NEPA guidance from CEQ would help agencies to know when they should perform analyses of such impacts and when not, and would thus give the agencies CEQ standards -- entitled to deference by the courts -- to rely on in defense of their impact statements. For example, CEQ could issue guidance stating that assessment of the impacts on global environmental change of some kinds of projects is not realistic because such micro-level relationships with global phenomena are not ascertainable, and therefore that such assessments are not required by NEPA. Or CEQ could issue guidance directing agencies to employ certain technical methodologies, or to rely on certain scenarios, in assessing the impacts of their projects on global environmental change pursuant to NEPA.

(iii) There is a possibility that EO-mandated evaluations might be used by a citizens group to claim that the agency is violating NEPA by not assessing the same impacts under NEPA. NEPA guidance from CEQ could explain how the one-time EO reviews differ from that mandated by NEPA, and point out that some of the factors analyzed under the EO are not required to be considered under the NEPA statute. (On the other hand, the EO itself may assist agencies in complying with NEPA requirements. Depending on the specific circumstances, the program or project challenged under NEPA, and the extent of analysis undertaken by the agency, certain agencies might be able to submit their EO responses should a NEPA document on global environmental change be required, or even argue that compliance with the EO is the "functional equivalent" of NEPA review.)

DRAFT

Draft Executive Order -- Evaluation of federal programs relating to global environmental change

By virtue of the authority vested in me as President by the Constitution and statutes of the United States, and to further social, economic, environmental, and national security objectives consistent with the domestic and foreign policies of the United States, it is ordered as follows:

SECTION 1. (a) Policy. It is the policy of the Federal Government to protect and enhance the social, economic and environmental well-being and national security interests of the United States, to preserve world stability and sustainable development of the global economy and environment, to prevent unintended harm to other nations, and to assist other nations of the world in meeting the challenges of the next century.

(b) Purpose and scope.

(i) In furtherance of that policy, and in recognition that global environmental change is an emerging issue of potentially great significance to the Nation's social, economic and environmental well-being and national security interests, this Order is issued to direct a comprehensive analysis of the relationship between Federal Government activities and global environmental change.

(ii) Uncertainties surround the nature of global environmental change, the timing of such change, and even the likelihood of its occurrence. Nonetheless, the potential severity of the impacts from such change requires evaluation now of the potential effects of Federal activities on global environmental change, the potential impacts of global environmental change on Federal activities, and the possible Federal responses to such change.

(iii) This Order is issued to require each Federal agency to evaluate, on a programmatic basis, its activities in relation to global environmental change. These evaluations will (A) permit a government-wide baseline analysis of the relationship between government and global environmental change; (B) assist the development of a broad portfolio of possible responses to such change both domestically and internationally, and; (C) identify areas showing the greatest need or promise for future initiatives.

[optional provision, to link this EO with the evolving international agreement process:

(iv) This Order additionally will assist the Nation's ability to negotiate and implement an international agreement on ~~steps to prevent deleterious~~ global environmental change.]

SEC. 2. Definitions. As used in this Order:

(a) "Global environmental change" refers to ~~several phenomena, including:~~

(i) A change in global climatic conditions that has been hypothesized to be occurring, due to increasing atmospheric concentrations of "greenhouse" gases (potentially including carbon dioxide, carbon monoxide, methane, chlorofluorocarbons, and nitrogen oxides) which may act to trap heat radiated from the earth's surface;

(ii) A depletion of the stratospheric ozone layer hypothesized to be occurring due to increasing atmospheric concentrations of certain substances, potentially including chlorofluorocarbons (CFCs), halons, methyl chloride, chloroform, carbon tetrachloride, and other chemical compounds;

(iii) Other global environmental changes, as may be elaborated in guidance issued under Section 4 of this Order.

(b) "Agency" shall have the same meaning as the term "Executive agency" in Section 105 of Title 5 of the United States Code, and shall include the military departments and the United States Postal Service.

SEC. 3. Agency evaluations of global environmental change.

(a) Each agency shall submit to the Assistant to the President for Science and Technology, and to the Chairman, Council on Environmental Quality (CEQ), an evaluation of its programs of statutory, regulatory, and administrative activities, in relation to global environmental change, by [July 1, 1990].

(b) In preparing its evaluation, each agency shall:

(i) evaluate its activities according to a scenario or set of scenarios of global environmental change provided or approved by the Office of Science and Technology Policy (OSTP) and CEQ;

(ii) recognize, in identifying response strategies, the need both to achieve goals at least cost and to retain flexibility to respond to new information, changing circumstances, and diverse local conditions; and

(iii) cooperate with the lead agencies identified in Section 4 of this Order in compiling and exchanging relevant data and information concerning global environmental change.

(c) Each agency's evaluation shall include:

(i) analysis of the potential direct or indirect effects of

the agency's activities on global environmental change, including the effects of its activities on both sources and sinks of greenhouse gases;

(ii) analysis of the potential direct or indirect effects of global environmental change on the agency's activities, including consideration of the broad range of possible social, economic, environmental, and national security consequences of such change;

(iii) analysis of possible Federal responses that might be taken to mitigate the effects of the agency's activities on global environmental change;

(iv) analysis of possible Federal responses that might be taken to mitigate the effects of global environmental change on the agency's activities;

(v) analysis of possible Federal responses that might be taken to assist adaptation of the agency's activities to global environmental change; and

(vi) identification of opportunities for specific administrative or legislative proposals which could facilitate mitigation of, or adaptation to, global environmental change, by providing for innovative government-initiated response measures, encouragement of innovative private response measures, and use of market-based mechanisms and other alternatives to command and control mechanisms in environmental regulation.

SEC. 4. Lead responsibility. OSTP, CEQ, and the Department of Justice, shall be the lead agencies supervising the conduct of this government-wide evaluation. To effectuate this Order, the lead agencies shall:

(a) issue guidance on preparation of the evaluations directed by this Order to the agencies, by [March 1, 1990], both

(i) establishing a ~~scenario or~~ set of scenarios of global environmental change through identification of the possible sources and effects of such change, so as to better inform those preparing the evaluations, and

(ii) establishing a standard format for preparation of the evaluations and presentation of assumptions, data, methods, and conclusions. The agencies shall be afforded an opportunity to comment on the proposed format;

(b) develop and maintain, with the cooperation of other interested agencies and to be made available to interested agencies, a compilation of data and information relevant to global environmental change; and

(c) advise and assist the agencies in the preparations of their evaluations.

SEC. 5. General provision. This Order is issued solely for the purpose of conducting an evaluation of the relationship between governmental activities and global environmental change. This Order is not issued to implement any statutory requirement, and nothing in this Order shall create any right or benefit, substantive or procedural, enforceable by a party against the United States, its agencies, its officers, or any person.

COUNCIL OF ECONOMIC ADVISERS
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON

MEMBER OF THE COUNCIL

December 27, 1989

MEMORANDUM FOR THE HONORABLE FREDERICK M. BERNTHAL
ASSISTANT SECRETARY, OES
DEPARTMENT OF STATE

FROM: RICHARD SCHMALENSEE

SUBJECT: Comments on Working Group II Papers

Attached are comments that were accepted to be included in the Legal Measures and Economic Measures papers drafted by Working Group II. We would like these changes transmitted to the IPCC.

Attachment

ATTACHMENT A

SUGGESTED LANGUAGE FOR RSWG LEGAL MEASURES TOPIC PAPER

The following should be inserted under Section 1 (Preamble)

Commitment to consider the possible adverse socio-economic impacts of policies that might be taken to address climate change.

Recognition that the interests of the international community relate to global climate objectives, not the means by which they are achieved.

Recognition that any arrangements between individual countries that maintain an overall greenhouse contribution within the sum of their individual obligations should be acceptable as a compliance strategy.

ATTACHMENT B

U.S. COMMENTS ON ECONOMIC MEASURES PAPER

Given that the paper is inclusive rather than exclusive of differing viewpoints, we hope that the following perspectives can be reflected in the body of the final paper. Suggested insertion points are provided alongside each item.

Page 2, paragraph 1: (substitute for or expand on last sentence)

The ultimate purpose of policy measures to slow climate change is to enhance overall welfare. Overall well-being depends on both the socio-economic and environmental effects of climate change and the socio-economic effects of emission targets and the policy measures implemented to reach them. Whether or not a strict cost benefit approach is applied, it seems clear (to some?) that both kinds of socio-economic impacts must be taken into account in setting policy targets.

Page 5, enumeration of criteria for convention or protocol. (additions)

The international policy regime should recognize that the interests of the international community relate to global climate objectives, not the means by which they are achieved.

International measures should recognize any arrangements between individual countries that maintain an overall greenhouse contribution within the sum of their individual obligations as an acceptable compliance strategy.

Page 7, paragraph 1 discussion of right to pollute (points to weave into the discussion)

Both regulation and economic instruments effectively allow for the same right to pollute: the only difference is in the transferability of this right. Regulation does not banish the profit motive, since profit opportunities in regulatory systems are often directly dependent on securing favorable regulatory treatment. The waste of resources in lobbying for favorable regulatory treatment represents a drawback to the regulatory approach.

Page 9, paragraph 2 discussion of sinks (addition)

An international policy regime that focuses on global climate objectives, rather than the means by which they are achieved, would treat sink creation and emissions reduction as one for one substitutes.

Page 9, enumeration of benefits (additional point)

opportunity for low income rights holders to sell rights to others in exchange for compensation of greater value.

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS

Date: December 27, 1989

Please deliver to: Frederick M. Bernthal

FAX number of addressee: 647-0774

Telephone number of addressee: 647-1554

From: Barbara Claffey

FAX number of sender: 395-6947

Telephone number of sender: 395-3114

Number of pages, including cover sheet: 6

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COUNCIL OF ECONOMIC ADVISERS
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON

MEMBER OF THE COUNCIL

December 20, 1989

MEMORANDUM FOR THE HONORABLE FREDRICK M. BERNTHAL
ASSISTANT SECRETARY, OES
DEPARTMENT OF STATE

FROM: RICHARD SCHMALENSEE

SUBJECT: U.S. Position on RSWG Topic Papers

As indicated in both Presidential statements and in the charge to the DPC Working Group on Climate Change, the policy response of the international community should be determined based on consideration of the costs of action and inaction. Despite this, relatively little attention is given to assessment of the social and economic costs of action in the RSWG documents that we have seen to date.

We understand that the consequences of inaction are being considered by the Working Group on Impacts (WGII). In our view, the development and presentation of information on the consequences of action that is essential to the choice of an appropriate response strategy clearly falls within the purview of the RSWG. From the perspective of the United States, development of this information is of co-equal importance to the development of information on legal, economic, technology transfer, and public information mechanisms that will ultimately be used to implement whatever strategy is decided upon.

It is important that the RSWG topic papers incorporate language that is inclusive of the current USG position on global climate change. Attachment A provides language for two new ticks in the Preamble of the RSWG Legal Measures Paper. The first new tick states that the socio-economic impact of policy responses as well the socio-economic impact of climate change be listed as a factor to be considered in any Protocols negotiated under the framework. The second new tick states that the interests of the international community relate to global climate objectives, not the means by which they are achieved. In particular, any arrangements between individual countries that hold their overall greenhouse contribution within the sum of their individual obligations should be acceptable as a compliance strategy.

Attachment B provides comments and suggested language for the Economic Measures Topic Paper.

We will assume that the contents of Attachments A and B will be fully incorporated in the U.S. comments to be submitted by January 1 unless we hear from you to the contrary.

Attachments

ATTACHMENT A

SUGGESTED LANGUAGE FOR RSWG LEGAL MEASURES TOPIC PAPER

The following should be inserted under Section 1 (Preamble)

Commitment to consider the possible adverse socio-economic impacts of policies that might be taken to address climate change.

Recognition that the interests of the international community relate to global climate objectives, not the means by which they are achieved.

Recognition that any arrangements between individual countries that maintain an overall greenhouse contribution within the sum of their individual obligations should be acceptable as a compliance strategy.

ATTACHMENT B

U.S. COMMENTS ON ECONOMIC MEASURES PAPER

Given that the paper is inclusive rather than exclusive of differing viewpoints, we hope that the following perspectives can be reflected in the body of the final paper. Suggested insertion points are provided alongside each item.

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> The ultimate purpose of policy measures to slow climate change is to enhance overall welfare. Overall well-being depends on both the socio-economic and environmental effects of climate change and the socio-economic effects of emission targets and the policy measures implemented to reach them. Whether or not a strict cost benefit approach is applied, it seems clear (to some?) that both kinds of socio-economic impacts must be taken into account in setting policy targets.

Page 5, enumeration of criteria for convention or protocol. (additions)

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Page 9, enumeration of benefits (additional point)

opportunity for low income rights holders to sell rights to others in exchange for compensation of greater value.

CLOSE HOLD

12-15-89 12:00 PM

FINAL

December 15, 1989

MEMORANDUM FOR THE DOMESTIC POLICY COUNCIL

SUBJECT: Reforestation Initiatives

Issue:

The parameters and details of an Administration initiative for trees.

Background:

The President is committed to wise stewardship of our nation's natural resources. In the book Building a Better America, the President noted the environmental and recreational significance of our parks, forests, and similar areas. As part of this commitment, the President has long advocated reforestation. A White House fact sheet dated September 18, 1989 noted the President's personal interest in planting trees. The emphasis on reforestation also has implications for international environmental issues, specifically global change.

In 1988, the President stated he would combat the greenhouse effect with the "White House effect." The June 1989 Paris Economic Summit highlighted environmental issues, including climate change. The final summit communique called for "adoption of substantial forest management practices." In November 1989, the U.S. joined 70 nations in signing the Noordwijk Declaration. Although not a binding document, signatory countries recognized the need to stabilize the emissions of greenhouse gases as soon as possible and agreed that it is timely to explore targets for CO_2 emissions reductions. Also noted in the declaration was the importance of reforestation.

There is substantial scientific consensus and public concern over the adverse effects that atmospheric increases in "greenhouse gases," such as carbon dioxide (CO_2), methane (CH_4), and chlorofluorocarbons (CFCs), are likely to have on the global climate. Such gases come from industrial and natural sources, as well as from land use changes such as deforestation. CO_2 accounts for less than half of greenhouse emissions, yet it is politically controversial, and one of the major issues under discussion in international environmental negotiations. A small reforestation program may establish U.S. leadership and give added credibility to any proposal we may put forth regarding large-scale, global reforestation. Unilateral adoption of a large scale program, however, could reduce our leverage by giving away something with which we might bargain.

The United States contributes 23 percent of the total worldwide fossil fuel CO_2 emissions (not including the effects of tropical deforestation), although its share of the total has been and is expected to continue rapidly to decline. In absolute terms, U.S. CO_2 emissions from 1973 through 1987 have been essentially flat, with the emissions average during that time period equal to the 1972 level. Plausible unilateral U.S. actions to reduce CO_2 emissions, including the reforestation options presented here, will have negligible effects on the global environment. Analysis of a wide range of emission scenarios in which the U.S. acts unilaterally to reduce CO_2 emissions by 10 percent in 1995, shows that the expected worldwide doubling of CO_2 in the mid-21st century is delayed by only 2 to 6 months.

There are substantial scientific uncertainties about the actual strength, timing and character of human and nature induced climate change. Nevertheless, planting trees, <u>especially</u> where justified by more certain non-climate benefits, can be an effective way to reduce levels of CO_2 while obtaining other benefits. Of course, CO_2 taken up by trees is sequestered only until they are burned or decompose.

Tree planting can provide other environmental benefits, including improved air quality, increased water quality, and reduced soil erosion. It can also result in improved wildlife habitat and enhanced opportunities for outdoor recreation.

<u>Current Reforestation Activities</u>:

In FY 1988, approximately 3.4 million acres were planted in trees or seedlings on public and private lands. Total trees planted exceeded 2.3 billion (see figure 1).

Land available for planting trees can be divided into agricultural and non-agricultural. In the agricultural category, land is used for crops and pasture. Pastureland is usually economically marginal, environmentally sensitive and frequently erodible if overgrazed. Agricultural land offered for tree-planting is most likely to be idle, very poor land, owned by individuals who do not depend on farming for most of their income. Non-agricultural land includes private (industrial or non-industrial) and public (Federal, state and local) forestland.

Nearly three fourths of the productive timberland in the U.S. lies on private lands. Seventy-five percent of this timberland is owned by non-commercial, small woodlot owners. The current growth and opportunity for future growth in tree planting is on agricultural and other privately owned land, especially on small woodlots after timber harvests.

Figure 1. Tree Planting By Ownership - FY 1988

Federal Government	Acres	Trees Planted in Thousands	Percent of all Planting
National Forests	293,271	199,000	8.6
Dept. of the Interior	40,482	27,000	1.2
Other Federal Agencies	10,738	7,500	0.4
Total	344,491	233,500	10.2
Non Federal Public			
State Forests	59,323	40,000	1.7
Other State Agencies	13,520	9,200	0.4
Other Public Agencies	12,378	8,400	0.4
Total	85,221	57,600	2.5
Private			
Industrial Owners	1,389,716	945,000	40.9
Small Owners	1,575,050	1,017,000	46.4
Total	2,964,766	2,016,000	87.3
Grand Total	3,394,478	2,305,100	100.0

Both public and private sector programs are involved in tree planting. Most financing and technical assistance for non-industrial, private tree planting is provided by the Department of Agriculture and their Forest Service. Actual planning and planting are undertaken by state foresters in the 50 states and 3 territories. Private sector organizations, such as the American Forestry Association ("Global Releaf", National Urban Forestry Council) and the National Arbor Day Foundation ("Tree City USA", Trees for America), also provide technical assistance.

USDA Tree Planting

The Conservation Reserve Program (CRP), operated by USDA, is designed to retire environmentally sensitive and economically marginal agriculture-related land to soil conserving cover, including forest through 10 year contracts with farmers. To the extent practicable, 12.5 percent of this land is to be devoted to trees. The land can reconvert to agricultural uses at the end of the contract period.

Technical responsibility for CRP planting is assigned to the Forest Service, and technical service to landowners is provided by state forestry personnel. The CRP contributed 245,000 acres of trees planted in 1989 (167 million trees/year and over 1.3 billion trees since the beginning of the program). The current CRP authorization expires at the end of the 1990 crop year. Some portion of the 82.1 million acres of crop and pasture land which meet the criteria of environmental sensitivity could be included in a tree planting CRP-like program.

Current Federal programs targeting non-Federal forest lands include the Forest Incentives Program (FIP) and a program of technical assistance provided through the Forest Service. FIP provides about $12 million per year for technical assistance and Federal 50/50 cost share for reforestation, timber stand improvement, and other forest needs on non-industrial private forest lands (NIPF). The Forest Service annually funds about $5 million for direct technical assistance through State forestry agencies to NIPF landowners. These programs are used for planting on non-Federal forestlands, such as non-industrial private forests, and on crop and pasture lands on a cost-shared basis, <u>without</u> rental payments.

Additional tree planting could be linked to existing crop subsidy programs. The concept is not fully addressed in the current options, but could be developed. This "agricultural incentive program" would have farmers participate in a trees planting program as a requirement of receiving benefits from USDA crop support programs. Farmers could plant trees in a portion of their eligible acreage. In recent years, acreage participating in the five largest programs (corn, sorghum, wheat, cotton, and rice) amounted to roughly 225 million acres -- with about 40 million acres set-aside by farmers to participate in the support programs. Federal outlays for these programs exceed $5 billion per year. A requirement that 5 percent of eligible acreage be planted with trees would yield an additional 10 million acres, on lands heretofore used as croplands.

Reforestation of National Forest lands totaled 300,000 acres in FY 1988. Nearly 200 million trees were planted. Planting is done following: timber harvest; natural disasters such as fire, insects and disease; and previously unsuccessful reforestation. Some sites regenerate naturally without special treatment or investment. Others require site preparation to encourage natural regeneration or preparation for seeding or planting. Total Federal cost for Forest Service reforestation in FY 1988 was about $250 million.

The Urban and Community Forest Program provides technical assistance for community forests in cities and towns. It is designed to improve soil, water and air quality and is funded

through the USDA Forest Service.

Other Federal Tree Planting

The Department of the Interior and other agencies reforested about 51,000 acres in FY 1988, with 34 million trees. Most is done by the Bureau of Land Management (BLM), principally in Oregon. BLM spent over $22 million in FY 1988 for reforestation.

Any new program could be a mix of non-Federal forestlands and agricultural lands. Some agricultural land can be attracted with cost-sharing, while other agricultural land can only be attracted with a CRP-like program. While planting costs themselves are moderately lower on agricultural lands than on non-industrial forestland, if CRP-like annual rentals were required, the total cost would be much higher. Furthermore, some land which would require a CRP-type rental could revert to its previous use after the full rental period is over.

Another concern is that a large tree planting initiative could have a depressing effect on non-subsidized planting. This would occur if a large subsidized tree planting program depressed timber prices and resulted in reduced planting by forestry firms.

Congressional Activity:

There are several legislative proposals that would increase tree planting, four in the Senate and one in the House. The Farm Conservation and Water Protection Act of 1989 (S. 970, the "Fowler Bill") is the probable vehicle for any action in the near future. It is a forerunner of the 1990 Farm Bill and contains specific authority to increase tree planting through a CRP-like program, directing a greater percentage of lands under the program to be planted with trees, instead of grasses (currently only 6.7 percent of CRP lands are planted with trees.)

Options For a Tree Planting Initiative:

Prior to the Paris Economic Summit, the Environmental Protection Agency proposed a major commitment to tree planting to reduce the effects of global warming. Subsequent to the Summit, a task force consisting of DOE, EPA, OPD, USDA, and USDI met to further develop and refine options for a reforestation initiative, in consultation with other agencies. According to the interagency task force, the goals of a reforestation initiative include:

- Offset increases in U.S. CO_2 emissions.
- Demonstrate U.S. commitment to worldwide forest management and address global change.

- Provide leadership to support conservation in the U.S. through public-private partnerships and volunteer approaches to tree planting and forest management.

- Improve forest management and provide multiple environmental and economic benefits.

Several options are presented below. All have some volunteer component. They differ in the amount and type of Federal programmatic activity. The FY 1991 Budget now includes Option #3 as a part of a proposed initiative, with budgetary costs entirely offset by revenue from user fees to be paid into an environmental endowment fund.

Community Trees/Volunteer Program

Provides Federal Government leadership, coordination, and promotion, designed to stimulate an all-out volunteer effort to plant an average of 30 million trees annually. It includes provisions for technical assistance to make tree planting effective.

It would expand the existing USDA Forest Service Urban and Community forestry network of Federal-State-Local government agencies, organizations and community activists and generate private contributions of funds and volunteer labor to sustain the planting and maintenance of urban and community trees.

Federal funds would be allocated through state forestry agencies and as direct grants to conservation and citizen organizations. State forestry staff or contract forestry consultants would provide technical assistance and program coordination activities. It is anticipated that national leadership would be provided by a Presidential Blue Ribbon Commission, ensuring proper coordination between Federal, state and local efforts. A Volunteer Trees Foundation under Commission oversight could promote and organize private contributions for tree planting.

This option would provide high non-climate payoffs, such as savings on residential air-conditioning, or improved recreational opportunities on community lands. Furthermore, it would reverse the present "deforestation" trend occurring in America's cities and towns, where only one tree is now being planted for every four that die or are removed. Through personal involvement and commitment of the volunteers, the option would result in a renewal of public support and commitment to improving the environmental, economic, and social well-being of the nearly 40,000 cities, towns, and communities in the United States.

Annual trees planted: 30 million trees

Federal Costs:
Total (20-year): $1.0 billion
First year: $50 million

Est. Average Annual Federal cost/tree: $1.67

Option I - Current Agricultural Land Program

The Conservation Reserve Program, emphasizing Federal rental payments as an incentive to set aside land for tree planting. It is designed to retire environmentally sensitive and economically marginal agriculture-related land to soil conserving cover, such as forest and grasses. Technical responsibility for CRP planting is assigned to the Forest Service, and technical service to landowners is provided by state forestry personnel.

This option is estimated to have the least amount of carbon sequestered, of the options presented here.

Includes the following, along with annual trees planted or improved:

A. Community Trees/Volunteer program: 30 million trees

B. Continue Current CRP: 318 million trees

-- 50/50 cost share for establishment, technical assistance, and annual rental payments by the Federal government.

-- 12 million acres of economically marginal, environmentally sensitive agricultural land in 20 years.

- o 8 percent cropland (more expensive to enroll)
- o 92 percent pastureland (less expensive to enroll)

Annual Trees Planted/Improved: 348 million trees

Federal Costs:

A. Total (20 year): $1 billion
First year: $50 million

B. Total (35 year): $4.2 billion
First year: $ 57 million

Total A to B (20/35 years) $5.2 billion

Est. Average Annual Federal cost/tree: $0.74

	1991	1992	1993	1994	1995
Budget Year Costs:	107	121	136	151	166

Pros

- Maintains existing USDA/State delivery system for tree planting developed under CRP, no build-up in delivery system is necessary.
- Very modest commitment to offsetting CO_2 emissions.
- Additional tree planting keeps prices stable and avoids negative impact on forest industry.
- Small effect on agricultural commodities markets.

Cons

- CRP component requires new legislative authorization.
- High cost of rental payments, committing Federal participation for 35 years with high total costs. Requires the Federal government to pay landowners to convert from one land use (crop or pasture) to another use (forest), rather than to simply improve a use currently in place, such as on non-Federal forest land. Actual experience under the CRP for converting cropland to trees shows that costs exceed estimates. A survey of CRP participants who planted trees (about 6 percent of the CRP program) found that landowners would require rental rates 25 percent higher than they accepted the first time around to induce them to convert more cropland to trees under 10-year contracts.
- Some local negative effects on agricultural input industries.
- There is a risk that CRP enrolled agricultural lands will be reconverted into row crop or pasture production at the end of the contract period, eliminating the expected CO_2 and other benefits despite the costs.
- A tree planting initiative that puts more than 3/4 of the funding into technical assistance and rental payments and less than 1/4 into actual tree planting may be less efficient and credible than other options.

Option II - Agricultural Land Emphasis

This is a CRP-like program, emphasizing Federal rental payments as an incentive to set aside land for tree planting.

This option is estimated to have a moderate amount of carbon sequestered, of the options presented here.

Includes the following, along with annual trees planted or improved:

A. Community Trees/Volunteer program: 30 million trees

B. Agricultural Land Initiative: 700 million trees

-- Based on CRP model (50/50 cost share for establishment, technical assistance, and annual rental payments by the Federal government).

-- 20 million acres of economically marginal, environmentally sensitive agricultural land in 20 years.

- o 8 percent cropland (more expensive to enroll)
- o 92 percent pastureland (less expensive to enroll)

C. Non-industrial Forestland Program: 230 million trees

-- Based on CRP model (50/50 cost share for establishment and technical assistance and annual rental payments by the Federal government for private, non-industrial forestlands).

-- 10.7 million acres of non-Federal forestland tree planting and forest stand improvement in 20 years.

Annual Trees Planted/Improved: 960 million trees

Federal Costs:

A. Total (20 year):	$1 billion
First year:	$50 million
B & C. Total (35 year):	$8.7 billion
First year:	$170 million
Total A to C (20/35 years)	$9.7 billion

	1991	1992	1993	1994	1995
Budget year costs	170	203	233	273	298

Est. Average Annual Federal cost/tree: $0.49

Pros

- o Demonstrates U.S. commitment to offsetting CO_2 emissions.
- o Reduces consumer lumber prices from what they would be without a trees initiative and still gives tree growers substantial earnings.
- o Small effect on agricultural commodities markets.

Cons

- o CRP component requires new legislative authorization.

- o High cost of rental payments, committing Federal participation for 35 years with high total costs. Requires the Federal government to pay landowners to convert from one land use (crop or pasture) to another use (forest), rather than to simply improve a use currently in place, such as on non-Federal forest land. Actual experience under the CRP for converting cropland to trees shows that costs exceed estimates. A survey of CRP participants who planted trees (about 6 percent of the CRP program) found that landowners would require rental rates 25 percent higher than they accepted the first time around to induce them to convert more cropland to trees under 10-year contracts.

- o Some local negative effects on agricultural input industries. Some regional redistribution of the timber industry may result, from the West to the Southeast.

- o It is doubtful that the acreage target can be met while holding cropland to only 10 percent of enrolled acreage. The cost of an agricultural lands program may be even higher than 47 cents per tree if a larger proportion of cropland is needed (rather than pastureland) to meet acreage targets.

- o There is a risk that CRP enrolled agricultural lands will be reconverted into row crop or pasture production at the end of the contract period, eliminating the expected CO_2 and other benefits despite the costs.

- o Fewer non-climate benefits under the agricultural component since erosion and water quality problems are less on pastureland (90 percent of the program) than on cropland.

- o A tree planting initiative that puts more than 3/4 of the funding into technical assistance and rental payments and less than 1/4 into actual tree planting may be less efficient and credible than other options.

Option III - Non-Industrial Forestland Emphasis

An FIP-like technical assistance, cost-sharing program for private, non-industrial forestlands and agricultural land, with no CRP-like component. It is included in the FY 1991 Budget as a part of a new initiative. The costs would be fully funded by increased user fee revenues through an environmental endowment fund also proposed in the Budget.

It also includes funding of $35 million in the first year to

capitalize a Volunteer Foundation or provide the Presidential Commission with funds for a challenge cost share program to leverage initial private funds for early, highly visible tree planting. The Community Trees/Volunteer program in the other options provides no funds for actual planting of trees. Instead, it funds technical assistance and coordination.

This option is estimated to have a moderate amount of carbon sequestered, of the options presented here.

Includes the following, along with annual trees planted or improved:

A. Volunteer program: 30 million trees

B. Non-Industrial Forestland Initiative: 970 million trees

-- Based on current FIP (from 50/50 to 75/25 cost share for establishment and technical assistance for private, non-industrial forestland and agricultural land in rural areas).

-- A goal of 20 million acres of non-Federal forestland planting and forest stand improvement. Around 12 to 15 million acres is realistically attainable. It is uncertain whether there is enough incentive in a 50/50 cost share program to attract the remaining 5 to 8 million acres.

C. Forestry Stewardship Initiative:

-- Expand current stewardship program (partly 50/50 cost shared with states to provide a basic technical assistance capability in State Foresters offices, and partly 100 percent Federal program to reach the needed scale to support all of the planting funded under A and B, above).

-- State forestry staff or contract forestry consultants assist land owners in developing property management plans.

Annual Trees Planted/Improved: 1 billion trees

A.	Total (20 year):	$700 million
	First year:	$35 million
B.	Total (20 year):	$1.8 billion
	First year:	$90 million
C.	Total (20 year):	$1 billion
	First year:	$50 million

Total A to C (20 years): $3.5 billion

	1991	1992	1993	1994	1995
Budget year costs	175	175	175	175	175

Est. Average Annual Federal cost/tree: $0.18

Pros

- Has no impact on the deficit because the budget costs are fully offset from an environmental endowment fund. Funds the budgetary costs of the Trees program entirely from user fees paid into an environmental endowment fund by those who use and have the most concern about protecting the high quality of the outdoor environment.

- No new legislation is needed.

- Demonstrates some U.S. commitment to offsetting CO_2 emissions.

- Low total costs, funds are allocated mainly to a more cost effective option: the FIP-like cost sharing and technical assistance program which leverages Federal and State funds, and small owner cost-sharing to improve the economics of some small owner investment. Allocates more funds to actual tree planting and improvement, rather than to rental costs under a CRP-type program.

- Makes a trees initiative an integral part of a broader environmental initiative which stresses improving the outdoor environment of America in a number of ways.

- The Forestry Stewardship consolidates technical assistance from three programs: woodlot owners receiving Federal cost-sharing, woodlot owners assisted by separate State programs, and assistance to community governments and organizations. This consolidation should improve productivity and give flexibility to allocate effort where the payoff in trees planted is highest.

- Improved harvesting practices and replanting will help to ensure adequate regeneration of harvested stands on NIPF lands. This should help to lessen harvest pressures on Federal lands in future years.

- Minor impact on food supply and agricultural input sector, would enhance timber supply without depressing stumpage prices.

Cons

- Would have deficit impacts several times higher than the Volunteer Program alone, if offsetting receipts to the environmental endowment are not enacted, though substantially lower than option II or IV.

- o Principal program benefits beyond the Volunteer Program accrue to private, small woodlot owners, does not fully use available opportunity to plant on agricultural lands.

- o Requires a massive landowner behavioral response to a limited financial incentive (50/50 cost share). Private ownership investment funds and demand for cost sharing on non-industrial forest land may be insufficient to accomplish annual acreage target over 20 year program. Cost share may have to be increased to 75 percent Federal.

- o Excludes farmers and ranchers from subsidy unless they own lands where it is economical to invest in tree planting on a 50/50 cost-sharing basis.

- o Will replant trees that should have been planted anyway.

Option IV - Enhanced Agricultural Lands Emphasis

An expanded CRP-like program, emphasizing Federal rental payments as an incentive to set aside land for tree planting, but at a much larger scale to offset additional CO_2 emissions.

This option is estimated to have the most amount of carbon sequestered, of the options presented here.

Includes the following, along with annual trees planted or improved:

A. Community Trees/Volunteer program: 30 million trees

B. Enhanced Agricultural Land Initiative: 1.295 billion trees

-- Based on CRP model (50/50 cost share for establishment, technical assistance, and annual rental payments by the Federal government) but much larger scale.

-- 37 million acres of economically marginal, environmentally sensitive agricultural lands in 20 years.

  - o 20 percent cropland (more expensive to enroll)
  - o 80 percent pastureland (less expensive to enroll)

C. Non-industrial Forestland Program: 624 million trees

-- Based on CRP model (50/50 cost share for establishment and technical assistance and annual rental payments by the Federal government for private, non-industrial forestlands).

-- 26.8 million acres of non-Federal forestland tree planting and forest stand improvement in 20 years.

Annual Trees Planted/Improved: 1.95 billion trees

Federal Costs:

A.	Total (20 year):	$1 billion
	First year:	$50 million
B & C.	Total (35 year):	16.2 billion
	First year:	$187 million
Total A to C (20/35 years):		$17.2 billion

	1991	1992	1993	1994	1995
Budget year costs:	237	300	363	434	488

Est. Average Annual Federal cost/tree: $0.44

Pros

- Highest level of CO_2 emissions offset. Most clearly establishes U.S. in a leadership role in tree planting to offset CO_2 while proposing actions likely to be less controversial than direct reductions of fossil fuel emissions. Could provide an example for other countries.
- Includes a significant effort in all areas where major opportunities for tree planting exist - in urban and community locations, on agricultural lands, and on non-industrial private forests.
- Greatest favorable effect on rural economies through creation of new employment opportunities and increased economic activity.

Cons

- CRP component requires new legislative authorization.
- Highest cost option, uses a CRP-like program, in order to attract a large amount of agricultural land. Inefficient as it requires payments to landowners at high Federal cost to convert from one land use (crop or pasture) to another use (forest), rather than to simply improve a use currently in place, such as on non-Federal forest land.
- Commits Federal participation for 35 years with high total costs of $17.2 billion, a substantial portion of which is annual rental payments. (Although focus on pasturelands and forestlands will have much lower rental rates than CRP croplands). Actual experience under the CRP for converting

cropland to trees shows that costs exceed estimates.

- Non-climate benefits are unlikely to justify a costly program on this scale. Justification hence, depends on highly uncertain climate benefits.

- Greatest negative impact on food production and timber supply and on agricultural input sector.

- See Option II for additional cons.

THE CHAIRMAN OF THE
COUNCIL OF ECONOMIC ADVISERS
WASHINGTON

December 13, 1989

MEMORANDUM FOR D. ALLAN BROMLEY

FROM: MICHAEL J. BOSKIN

SUBJECT: U.S. Position on Climate Change Convention

I have recently had some disturbing conversations about the ongoing international discussions aimed at the development of a framework climate change convention and subsequent protocols, as well as the position that U.S. representatives have taken in those discussions. I am writing to let you know that it is imperative that a major shift in our position be made.

The U.S. has apparently not challenged the view (which is reflected in Fred Bernthal's memo to you of October 24 and, even more clearly, in the legal and institutional measures portions of the October RSWG Workshop draft report now being circulated for comment by EPA) that the convention should be drafted in anticipation of a large number of gas-specific and policy-specific follow-on protocols. This many-protocol approach ignores important regulatory lessons that have been painfully learned in the U.S.; it would place us and the world as a whole on a path toward unending negotiation and detailed regulation that would be both ineffective and expensive. <u>This approach is philosophically inconsistent with the President's approach to regulation in general and with his stated position on the need to reconcile the environment and economic growth.</u>

A far superior approach, which the U.S. should adopt forthwith, would be to draft the convention in anticipation of negotiating only country-specific limits on total net greenhouse emissions (or, more plausibly, a formula for computing those limits), along with protocols on baselines, funding mechanisms, enforcement, research, monitoring, technology transfer, and related implementation issues. This approach, which explicitly rules out gas-specific protocols and international agreements on specific control measures, would allow each country to find the best way to reduce its impact on global climate, taking into account its own economic, political, national security, and lifestyle conditions and concerns. Most nations, we should hope, would adopt flexible, incentive-based approaches, but those who choose to rely on other methods would be free to do so. All the world as a whole legitimately cares about is the change in the global atmosphere, not the method by which the U.S. or any other nation makes its contribution to that change.

The many-protocol approach would lead us instead to attempt to replicate on a world scale the sort of detailed command and control regulation (epitomized by scrubbers on powerplants) that we have tried and found wanting in the U.S. The inflexibility that would be induced by a large number of specific protocols would dramatically raise the costs of whatever actions were ultimately taken to mitigate global change. (We should also reconsider the need for multilateral protocols on adaptation, which are now envisioned, since, research and technology transfer aside, the adaptation measures that have been widely discussed have at most regional effects.)

The many-protocol approach may be a recipe for inaction. Strong actions to control emissions of any particular greenhouse gas or operation of any particular source category would impose very different costs on different nations. We might be willing to take drastic steps to reduce methane emissions from our rice paddies, for instance, but it is hard to imagine much enthusiasm in East Asia. If those nations don't go along with a strong rice paddies protocol, however, methane emissions from rice cultivation will not be noticeably decreased, even if such decreases would represent the most cost-effective way for East Asia to reduce its net greenhouse emissions. Bundling issues (gasses, sources, and sinks) makes an effective agreement to control net emissions more likely.

At the same time, the many-protocol approach may be a recipe for singling out the U.S. and other advanced nations for disproportionate burdens, since we might well find it hardest politically to resist any proposed protocols. Under this scenario, the first protocol would call for the equivalent of 50 m.p.g. CAFE standards for all new cars, the second would set absurd efficiency standards for home appliances, and so on. We could easily find ourselves nibbled to death by a large number of protocols aimed at rich nations but having, in aggregate, little effect on ambient greenhouse gas concentrations.

I thus consider it vitally important that the U.S. firmly and quickly reject the many-protocol approach in the IPCC process. That approach is inconsistent with the President's stated view, which is solidly grounded in U.S. experience, that flexible and incentive-based regulation best harmonizes environmental concerns with economic growth, and is particularly unlikely to produce sound policy in this multi-national setting.

On the other hand, I do not mean to suggest that a crusade on your part will be necessary to bring this about. Last week Boyden Gray met with representatives of EPA, State, Justice, CEA, and other interested parties, and he made the case for a position shift of the sort I have described. There was no visible resistance, so that this shift may occur without your participation. On the other hand, appearances can be deceptive,

and meditation may produce opposition. I thus urge you, if the occasion arises, to support movement away from the many-protocol approach to drafting a climate change convention and to a simpler and more rational approach based on changes in what matters: net greenhouse emissions.

I would, of course, be most interested in your reactions to all this.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 1 1989

OFFICE OF
GENERAL COUNSEL

MEMORANDUM

SUBJECT: IPCC/RSWG October Workshop Report: Request for Comments

FROM: Scott A. Hajost

TO: Alan Hecht
Dick Morgenstern
Courtney Riordan
Eileen Claussen

Attached is a copy of the legal and institutional measures portions of the October RSWG Workshop draft report. We can both correct the report and make additional suggestions. (In this regard, I might note that the general approach taken at the Workshop was to include suggestions as put forward.)

In order to meet State's deadline of December 15, please provide comments by COB December 13 to me (382-4550) or Tom Marshall (382-5313) of my staff.

Thank you.

cc Terry Davies
Tim Atkeson
Jack Fitzgerald w/o attachment
Dennis Tirpak w/o attachment
Steve Seidel

Attachment

4. REPORTS FROM THE TOPIC COORDINATORS

It may be recalled that the RSWG Steering Committee had agreed upon five topics for consideration at this session under its Task B, namely the broad area of implementation mechanisms and associated arrangements (see reference 1). The topics are:

a. Legal measures and processes (with Canada, Malta and UK as topic coordinators);

b. Public education and information (with China and the USA as topic coordinators);

c. Technology transfer and development measures (with India and Japan as topic coordinators);

d. Financial measures (with France and the Netherlands as topic coordinators with consultation with Egypt);

and

e. Economic (Market) measures (with Australia and New Zealand as topic coordinators).

At the invitation of the chairman, the topic coordinators reported on the synopses papers developed by them from the invited submissions from governments and organizations.

4.1 Report of the topic coordinators on legal measures and processes

The report by Mr. R. Beetham (U.K.) is reproduced in its entirety below.

1. I have very little to add to the synopsis produced by the Canadians, Maltese and ourselves on Legal Measures. We are very grateful to all those countries who contributed.

2. We asked contributors four questions:

- which existing international legal instruments have a bearing on climate and how could these instruments be strengthened to deal with climate change?

- what elements should be included in a framework Convention on climate?

- what other legal instruments (eg Protocols) might be considered?

- what institutional implications might such a Convention have?

3. There was a general view that, although existing international instruments should be fully utilised and further strengthened they are insufficient alone to meet the challenge of climate change. The majority of contributions therefore concentrated on proposals for elements to be included in a framework Convention and Protocols. Our synopsis inevitably reflected this main thrust.

4. As a result, we are conscious that we have not been able to do full justice to two contributions in particular, namely those from France and the United States. Both these papers, whilst not conflicting with the majority of views expressed by other contributors, set out a more general, almost philosophical approach which it was difficult to align with the rather more concentrated and specific approach of the large majority.

5. This broad statement does however need to be qualified by the recognition that only some two dozen countries sent contributions, and the majority of those came from developed countries. We should very much welcome further indications of view at this meeting - indeed that seems to us one of its principal purposes.

6. Equally, as we state in the paper, we could not always be sure where some ideas have been put forward by a limited number of countries, what degree of support or indeed opposition they might encounter: this week's meeting is an opportunity to gauge that more clearly.

7. We deliberated at length as to whether we should include in the synopsis attributions of ideas to particular countries. We concluded that we should not: partly because we felt it might be invidious, partly because we, inevitably in a summary, might not have accurately represented those views, and partly because we did not think it right ot make assumptions on the degree of support which particular suggestions might enjoy.

8. Nevertheless, as our synopsis paper makes clear, there is a broad mainstream of opinion which characterises the majority of the contributions, from which one can see a consensus of approach emerging on the principal elements which should be included in a framework Convention, the need for which is widely seen.

9. We have been encouraged by the emergence of the clear mainstream of opinion I have mentioned. We hope this week to hear further views with regard to what the principal elements in a convention should be so that we can enlarge on and deepen this mainstream. We also look forward to discussing how we might best take this work forward. We hope that our synopsis will contribute to such forward movement."

IPCC: RESPONSE STRATEGIES WORKING GROUP

Legal Measures

I. SUMMARY REPORT

1. The Workshop considered, on the basis of a synopsis of numerous written contributions and views expressed at the meeting, what elements should be included in a framework convention on climate change; what other instruments (e.g., protocols) might be employed; and the institutional implications of a framework convention.

2. There is a general view that existing legal instruments and institutions with a bearing on climate should be fully utilised and further strengthened (a list of relevant instruments and institutions is annexed), but that they are insufficient alone to meet the challenge of climate change. The discussion therefore concentrated on proposals for elements to be included in a framework convention, annexes and protocols, together with the institutional implications.

3. There is a very broad consensus among the participants on the need for a framework convention on climate change and that the framework Convention should generally follow the format of the Vienna Convention for the Protection of the Ozone Layer, and consensus that the framework convention would lay down, at a minimum, general principles and obligations, and provide for a continuing assessment of the scientific aspects of climate change and its impacts, and for response strategies.

4. There is also broad agreement that the framework convention should contain provision for separate annexes and protocols to be negotiated to deal with specific obligations, e.g., research and systematic observations, different greenhouse gases.

5. The participants recognise the political imperative of striking the correct balance between the call for a far-reaching action-oriented framework convention and the need urgently to adopt such a convention so as to begin tackling the problem of climate change. They also attach particular importance to the convention being framed and drafted in a way to gain the adherence of the largest possible number and most suitably balanced spread of countries.

6. Several participants advocate more far-reaching provisions, particularly on institutional aspects and control measures. There are differing views on the timing of negotiations both on a framework convention and on related annexes and protocols.

7. The following sections comprise a compilation of possible elements for a framework convention on climate change proposed by various participants. The inclusion of any particular element does not imply consensus with respect to that element, or the agreement of any particular government to include that element in a framework convention. Some of the proposed elements are controversial, some were in fact objected to, but all have been included to stimulate discussion at the national and international levels.
(WCP-662)

II. POSSIBLE ELEMENTS FOR INCLUSION IN A FRAMEWORK CONVENTION ON CLIMATE CHANGE

1. PREAMBLE

- Description of problem and reasons for action (need for speedy and effective response without waiting for absolute scientific certainty)

- Reference to relevant instruments (such as UNGA Resolution 43/53, Principle 21 of the Stockholm Declaration, ENMOD Treaty)

- Relationship to Vienna Convention and Montreal Protocol

- Common concern of mankind

- Respect for fundamental rights, such as a right to an environment of a quality that permits a life of dignity and well-being, or a right not to be subjected, directly or indirectly, to the adverse effects of climate change

- Need to balance sovereign right of states to exploit natural resources with duty to protect and conserve climate for benefit of mankind

- Endorsement of concept of sustainable development as key test in promoting long-term economic growth, and conservation of environment

- Importance of development and transfer of technology and recognition of circumstances and needs, particularly financial, of developing countries

- Need to increase research to improve scientific knowledge and study social and economic impacts

- Importance of systematic observation to develop further scientific knowledge of climate and the possible adverse effects resulting from changes to it

- Recognition of fact that most emissions affecting the atmosphere at present originate in industrialised countries where the room for change is greatest

- Recognition of fact that emissions from developing countries are growing rapidly and will represent over time a increasingly significant percentage of global emissions

- Development of stategies to absorb greenhouse gases, i.e. protect and increase greenhouse gas sinks

- Development of strategies to limit or reduce anthropogenic greenhouse gas emissions

- Development of strategies to adapt human activities to the impacts of climate change

- Need for regulatory, supportive and adjustment measures that take into account different levels of development of countries.

2. DEFINITIONS

Definitions will need to be elaborated on the basis of consensus as to the purpose of the framework convention (e.g., protection from the adverse effects of climate change), and according to the terms in which the framework convention is drafted.

The following definitions of certain terms for the purposes of the framework convention have so far been suggested:

(a) Climate

Adopt accepted WMO definition

(b) Climate change

"Change induced by human activities, directly or indirectly causing, or likely to cause, significant adverse environmental, economic or social effects provided that the human activities and their effects are not both wholly located within the area under the national jurisdiction of one state"

"Global climate change resulting from the growing accumulation of atmospheric greenhouse gases generated by human activities"

(c) Adverse effects

"Changes in global climate caused by human activities having signif_cant deleterious effects on natural or managed eco-systems, sea levels, etc."

There will be a need to define other terms.

3. GENERAL OBLIGATIONS

As stated earlier, the following sections comprise a compilation of possible elements for a framework convention on climate change proposed by various participants. The inclusion of any particular element does not imply consensus with respect to that element, or the agreement of any particular government to include that element in a framework convention. Some of the proposed elements are controversial, some were in fact objected to, but all have been included to stimulate discussion at the national and international levels. The degree of support for, or opposition to, individual ideas contained in this section is not reflected in this document.

- Responsibility to adopt appropriate measures to protect against the adverse effects of climate change, to limit and adapt to climate change and not transform adverse effects on the climate into any other adverse environmental or health effects

- Responsibility to protect and improve the composition of the atmosphere in order to protect and conserve climate for the benefit of present and future generations

- Encouragement to take steps having the effect of limiting climate change (e.g., reforestation, energy efficiency) but which are already justified on other grounds

- Specific objectives and time-targeted emission limitations/ reductions of greenhouse gases by industrialized countries

- Specific objectives and time-targeted emission reductions/limitations of greenhouse gases, for example an obligation to stabilise total global emissions of greenhouse gases from anthropogenic sources by the year 2000 and, as soon as possible thereafter reduce these emissions down to levels which according to the best scientific knowledge will secure human health and the Earth's capacity to sustain life processes

- Deferral of specific emission limitation/reduction obligations to subsequent protocols

- Use and exploitation of climate for peaceful purposes; encouragement of regional and global peace, and good neighbourliness

- Duty to carry out and co-operate in research and information exchange, systematic collection and transmission of data from observation, research and assessment

- Development and transfer of relevant technologies and the provision of technical assistance, particularly bearing in mind the needs of developing countries, including the prevention of climate change and adaptation to adverse impacts resulting from climate change

- Transfer to relevant technologies on a non-commercial and preferential basis to the developing countries irrespective of the stands of the various countries on the protection of intellectual property rights and free access to relevant scientific information

- Transfer of relevant technologies on a non-commercial and preferential basis to the developing countries and free access to relevant scientific information

- Encouragement of the transfer of technology related to climate change through adequate and effective protection of intellectual property rights in developing countries and removal by developing countries of other impediments to such transfers

- Open and nondiscriminatory access to meteorological data developed by all countries

- Financial assistance by the industrialised countries to the developing countries to enable the developing countries to meet the incremental costs of measures to minimize greenhouse gas emissions and to take adaptive measures. The specific mechanisms of such assistance including the share of various industrialised countries, and arrangements for making the funds available annually, should be included either in a convention or finalized within one year of coming into effect of the convention

- Fair and equitable assistance to countries which have to bear an abnormal or special burden, including provision of funds, over and above official development assistance, by the industrialised countries to the developing countries, to enable them to fulfil their obligations under the framework convention

- Co-operation in formulation and harmonisation of policies and strategies directed at limiting and adapting to climate change

- Co-operation in adoption of appropriate legal, administrative or economic measures to address the adverse effects of climate change

- Co-operation at national and international levels in adoption of appropriate legal, administrative and economic measures, including fair and equitable assistance, to address the adverse effects of climate change to the end that no island nation's very existence be allowed to be threatened by sea level rise

- Avoidance of other environmental problems in taking measures to address climate change

- Prior notice and provision of relevant information such as environmental impact assessment of large-scale planned activities that are likely to cause significant climate change

- Prior notice and provision of relevant information such as environmental impact assessment of large-scale planned activities that are likely to cause significant climate change. Each country has the right to withhold any information sensitive to its security or commercial right

- Recognition of the need for developing countries to increase their present levels of per capita emissions of greenhouse gases in order to meet their development needs

- Clear recognition of responsibility by all member countries to make efforts to limit or reduce greenhouse gas emissions

- Recognition that implementation may take place in different time frames for different categories of countries and/or may be qualified by means at the disposal of parties, and their scientific and technical capabilities

- Provision allowing for bilateral, multilateral and regional agreements or arrangements not incompatible with the framework convention, including opportunities for groups of countries to fulfil the requirements of the convention and associated protocols on a regional or sub-regional basis

- Co-operation with competent international bodies to implement effectively the objectives of the framework convention

- Public education and information

- Liability and compensation

- Commitment to formulate appropriate annexes and protocols, on a sound scientific basis
(WCP-662)

- Agreement on measures to be implemented by amending existing legal instruments

- Strengthening existing legal and institutional instruments and arrangements

- Making full use of existing funding mechanisms

- Creating new funding mechanisms

- Permissibility of more stringent national or regional emission targets than provided for in the framework convention and its protocols

4. INSTITUTIONS

- A Secretariat

- A Conference of the Parties

- A Bureau

- An Executive Committee composed of a limited number of parties, based on equitable geographical representation, possibly with binding decision-making powers and including functions in respect of surveillance, verification and compliance

- An Executive Committee with functions analogous to those assigned to the Executive Body under the ECE Long Range Transboundary Air Pollution Convention

- Working Groups, e.g., on scientific matters as well as on socio-economic impacts and response strategies

- Institution for the administration of a climate fund

5. RESEARCH AND SYSTEMATIC OBSERVATIONS

Co-ordinated research and systematic observations (which could be amplified in annexes), including for example the establishment of expert panels or of an independent scientific board responsible for the co-ordination of data collection from:

- scientific research
- the monitoring of climate change
- human activities affecting climate

6. INFORMATION EXCHANGE AND REPORTING

- Co-operation in exchange of scientific, technological and other information on climate change, with possibly the elaboration of a comprehensive international research prorgramme

- Transmission of information on measures adopted by the parties for the implementation of the framework convention, possibly including regular reporting on emissions of greenhouse gases

- Development of national emission inventories and strategies for addressing climate change; exchange of information on such inventories and strategies.

7. TECHNOLOGY TRANSFER

- Promotion of the development and transfer of technology, taking into account particularly the needs of developing countries

- Preferential and non-commercial transfer of technology to developing countries to enable them to limit or adapt to climate change

8. CONSULTATION

Consultations between, on the one hand, parties whose planned activities are likely to cause climate change and, on the other hand, the Secretariat, relevant international organisations and other parties concerned.

9. SETTLEMENT OF DISPUTES

- Provisions similar to those in the Vienna Convention for the Protection of the Ozone Layer

- A system with compulsory recourse to the ICJ or another appropriate tribunal issuing binding decisions.

10. OTHER PROVISIONS

(a) Status, adoption and amendment of annexes

(b) Rules for amendment of the framework convention

(c) Provisions for the adoption and entry into force of, and amendments to, protocols

(d) Periodic review of specific obligations based on assessments similar to those required by the Montreal Protocol

(e) Final clauses, including:

- Signature
- Ratification
- Accession
- Right to vote
- Relationship between the framework convention and its protocols
- Entry into force
- Reservations
- Withdrawal
- Depositary
- Authentic texts

11. ANNEXES AND PROTOCOLS

The following subjects among others have been suggested for consideration as possible annexes or protocols to the framework convention:

- Fossil fuels
- Carbon dioxide
- Agricultural practices
- Methane
- Nitrous oxide
- Tropospheric ozone
- Forestation
- Funding mechanisms, particularly for developing countries
- Research and systematic observations
- Energy conservation and alternative sources of energy
- Protection of greenhouse gas sinks
- Liability and compensation
- Emission control technologies

- Adaptation technologies and practices

- Development and transfer of technology.

Individual annexes or protocols might cover more than one of the above subjects.

- Priority should be given to those areas in respect of which the state of scientific understanding is the most developed and international concern the greatest

- Polluting gases should be dealt with according to their importance in increasing the greenhouse effect.

International Agreements Potentially Relevant to Climate Change

Contribution of the United States

Climate

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Various Bilaterals -- e.g., U.S.-U.S.S.R. Agreement on Cooperation in the Field of Environmental Protection, May 23, 1972

Specifies "influence of environmental changes on climate" as one of the areas for cooperation in solving problems. Contemplates exchange of experts, information and joint development of scientific programs.

Energy

International Energy Agency -- Agreement on an International Energy Program, Feb. 5, 1975

Provides framework to promote energy diversification, energy efficiency and conservation, and alternative energy sources. The IEA promotes R&D by sponsoring state-of-the-art reviews of promising energy technologies and by promoting collaborative projects between two or more member countries. The IEA has established an energy technology data exchange and a number of information centers dealing with specialized technology areas, including coal technology, heat pumps, air infiltration, biomass, and end-use technologies. Numerous implementing agreements cover wind, wave, biomass, solar, hydrogen, coal, and other energy sources, as well as conservation in specific industries. Twenty-one OECD countries are members; method for participation by other states not specified.

Solar Heating and Cooling Systems in Buildings -- Memorandum of Understanding, Oct. 4, 1974

Provides for research and information exchange to develop practical applications of solar power, a potential source of nonpolluting energy. Membership consists of mostly western countries.

International Atomic Energy Agency -- U.N. Statute, Oct. 26, 1956

Agency under the aegis of the U.N. to develop peaceful applications of atomic energy and to establish safeguards. Atomic energy does not produce greenhouse gases. Open to U.N. members and to states which are not U.N. members upon approval of IAEA General Conference.

Various Bilateral Energy Agreements

For example, the agreement between U.S. Department of Energy and its PRC counterpart has as its purpose "to explore the relationship of climate changes and atmospheric levels of CO2".

Bilateral Atomic Energy Agreements -- e.g., U.S.-U.S.S.R. Agreement on Peaceful Uses of Atomic Energy, June 21, 1973

Agreement to develop energy sources from thermonuclear fusion and fast breeder reactors and to establish scientific workgroups and exchanges.

Pollution Control

Convention on Long-Range Transboundary Air Pollution (LRTAP Convention), Nov. 13, 1979

Establishes research and monitoring programs. Broad definition of "air pollution" could include greenhouse gases. Open to members of the U.N. Economic Commission for Europe.

Protocol to LRTAP Convention on Long-Term Financing of the Co-operative Programme for Monitoring and Evaluation of the Long-Range Transmission of Air Pollutants in Europe (EMEP), September 28, 1984. Open to members of the U.N. Economic Commission for Europe.

Protocol to LRTAP Convention Concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes ("Sofia Protocol"), Oct. 31, 1988

Freezes emissions/transboundary fluxes of, and requires parties to utilize best available technologies economically feasible to reducing emissions of nitrogen oxides, which are greenhouse gases. Also requires parties to facilitate exchange of technology to reduce emissions of nitrogen oxides. Open to members of the ECE Economic Commission for Europe.

U.N. Convention on the Law of the Sea, Dec. 10, 1982. (not in force, but largely reflects customary international law)

Agreement to control pollution of the marine environment, includes measures to minimize "release of ... harmful or noxious substances through the atmosphere." (Art. 194) Potentially applicable to the extent that greenhouse gases and climate change are "harmful" to oceans.

Vienna Convention on the Protection of the Ozone Layer, March 22, 1985, and Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987

The chemicals (e.g., chlorofluorocarbons) that are regulated to protect the ozone layer are also greenhouse gases. Montreal Protocol, which provides for 50% reduction in production and consumption by 1999, is under review to accelerate reductions. Open to all states.

Convention on the Protection of the Environment between Denmark, Finland, Norway and Sweden, Feb. 19, 1974

Agreement is intended to protect and improve the environment through cooperation to ensure that activities under the jurisdiction of one State do not cause damage to the environment of other States.

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U.S.-Mexico agreement provides framework for Annexes on specific pollution reductions.

Natural Resources

Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere, Oct. 12, 1940

Could be made applicable to protecting forests. Open to "American Governments".

Treaty for Amazonian Cooperation, July 3, 1978

Applies to Amazonian Basin and any other "closely connected" territory. Declares that right to use natural resources is inherent in each state's sovereignty. Promotes development consistent with "preservation of the environment". Parties are Bolivia, Brazil, Columbia, Ecuador, Guyana, Peru, Suriname and Venezuela.

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Adopts goals of sustainable development and maintaining ecological processes. Parties undertake, e.g., to manage forest resources and to control air pollution.

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Contains agreement to reduce and control pollution from discharges into the atmosphere. Potentially applicable to measures to prevent climate change which harms oceans.

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Parties agree to consider ecology and natural resources in development plans.

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Established committee to promote cooperation to combat consequences of drought. Open to any African country declared to be a disaster area as the result of ecological conditions of the Sudano-Sahelian region.

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Approval of International Joint Commission required for obstructions or diversions from Great Lakes or other boundary waters between U.S. and Canada. Precedence for water uses specified.

Agriculture

U.N. Food and Agriculture Organization -- Constitution, as amended, Nov. 1959

Could assist adaptation to climate change by disseminating technical information and recommending action for agriculture and forestry. Subsidiary groups, like the International Rice Commission, could help with response strategies, for example, reducing methane emissions from rice paddies.

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Possible frameworks for development of adaptation strategies or for limiting methane emissions from agriculture.

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Possible framework to formulate joint plans, exchange information.

Financial Institutions

World Bank--Articles of Agreement, Dec. 27, 1945, Articles of Agreement, Jan 26, 1960

Loans by the International Bank for Reconstruction and Development and concessional loans by the International Development Association fund projects that could be helpful to minimizing climate change (e.g., agroforestry) or harmful (e.g., highway construction leading to deforestation). Environmental policies being implemented by the Bank could be adjusted to support limitation or adaptation response options.

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Could give regional support for limitation or adaptation response options. Regional banks include: Inter-American, Indus Basin, African, Andean, Asian, Caribbean, Arab, Central American, European, OPEC, Nordic

Sectorial Funds -- e.g., International Fund for Agricultural Development, Agreement, June 13, 1976

Concessional loans to developing countries. Could adopt policies to assist limitation or adaptation response options.

Draft: MJB → Bromley objecting to approach negotiate early overall levels/ standards, vs details.

global warming

United States Department of State

Assistant Secretary of State for Oceans and International Environmental and Scientific Affairs

Washington, D.C. 20520

October 24, 1989

MEMORANDUM

TO: Dr. D. Allan Bromley, Assistant to the President
Chairman, Working Group on Global Change

FROM: OES - Frederick M. Bernthal FB

SUBJECT: Legal Issues Relevant to Climate Change Convention

The Response Strategies Working Group (RSWG) of the Intergovernmental Panel on Climate Change (IPCC) has a mandate to "examine existing legal and institutional mechanisms to determine how they might be used to implement options to limit or adapt to climate change" and to "consider new legal and institutional mechanisms that could be used to implement options to limit or adapt to climate change".

Although the U.S. was initially non-committal about whether the RSWG's consideration of new legal mechanisms should include discussion of a framework climate convention, President Bush announced last May that the U.S. would host a RSWG workshop in the fall to consider various mechanisms (e.g., economic, financial, legal) that might be used to implement responses to potential climate change and that this would include consideration of elements of a framework climate convention. He also indicated his expectation that the IPCC process would lead to formal negotiation of such a convention.

To prepare for this October workshop, all IPCC member states were asked to contribute their views to designated international topic coordinators. The attached paper was the U.S. contribution to the legal mechanisms discussion, and was cleared by all interested USG agencies at the policy level.

As you will see from section IV, the U.S. expressed the view that a framework climate convention should generally follow the model of the 1985 Vienna Convention for the Protection of the Ozone Layer. The Vienna Convention is a barebones agreement that contains general principles of

cooperation and certain research and monitoring obligations, but no targets or timetables. Specific obligations are contained in subsequent protocols (to date, the Montreal Protocol); there is no obligation placed upon a party to the framework convention to join any protocol.

It should be noted that the RSWG workshop, which was held on October 2-6 in Geneva, revealed very broad consensus that:

> "[A] framework convention on climate change ... should generally follow the format of the Vienna Convention for the Protection of the Ozone Layer, ... would lay down, at a minimum, general principles and obligations, and provide for a continuing assessment of the scientific aspects of climate change and its impacts, and for response strategies ... [and] should contain provision for separate annexes and protocols to be negotiated to deal with specific obligations, e.g., research and systematic observations, different greenhouse gases."

However, several industrialized countries (Netherlands, FRG, Norway, New Zealand) indicated a desire to go beyond the "minimum", and key developing countries (Brazil, China, India, Mexico) made it clear that their price for any such convention "with teeth" would be high.

I would appreciate your views on how State/Justice might now expand on this work, pursuant to the directive of the first meeting of the Working Group on Climate Change.

Attachment: As stated

cc: C. **Boyden Gray**, Counsel to the President

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Regional Economic Cooperation Organizations

Affect development strategies, address energy and environmental issues. May develop binding regulations or proposed agreements. Regional organizations include:

U.N. Regional Economic Commissions
European Economic Community (e.g., adopted resolution on energy policy with specific fuel use targets; adopted EC environmental assessment procedures)
Organization for Economic Cooperation and Development
Organization of American States
COMECON
Organization of African Unity
ASEAN
South Asia Regional Council
South Pacific Forum
Andean Common Market
Caribbean Community
Economic Community of West African States

International Institutions Potentially Relevant to Climate Change

Climate

-- World Meteorological Organization (WMO): To coordinate, standardize, and improve world meteorological activities and to encourage an efficient exchange of meteorological information between countries. More specifically, WMO is charged with: 1) facilitating worldwide cooperation in the establishment of networks of stations to provide meteorological, hydrological, and other geophysical services and observations; 2) promoting the establishment and maintenance of systems for the rapid exchange of meteorological and related weather information; 3) promoting standardization of meteorological and related observations and to ensure the uniform publication of observations and statistics; and 4) assisting in coordinating the international aspects of research and training in meteorology. In addition, WMO manages the World Climate Program, which consists of applications, data, impact studies, and research, and is administered in coordination with UNEP and ICSU.

-- Intergovernmental Panel on Climate Change (IPCC): An ad hoc working group jointly established by WMO and UNEP, the IPCC is to assess available scientific information on climate change; assess available environmental and socio-economic impacts of climate change; and formulate response strategies. The IPCC is to submit an interim report on these topics in the fall of 1990.

Science

-- International Council of Scientific Unions (ICSU): To encourage international scientific activity by coordinating interdisciplinary and worldwide scientific projects and by working with appropriate nongovernmental and intergovernmental agencies in their implementation.

-- International Geosphere-Biosphere Programme (IGBP): Interdisciplinary body under ICSU within which the international scientific community seeks to identify and understand the basic global processes, including the basic forces driving environmental change.

-- UN Educational, Scientific and Cultural Organization (UNESCO): To contribute to peace and security by promoting international collaboration through, inter alia, science.

-- Intergovernmental Committee for Science and Technology for Development: The General Assembly, following 1979 UN Conference on S&T for Development, established this committee to assist it in issues related to science and technology policy and coordination, including initiating arrangements for the early identification and assessment of new S&T developments that may have potential importance for strengthening the S&T capacity of developing countries. Reports to General Assembly through ECOSOC.

-- Advisory Committee on Science and Technology for Development: This is the advisory body to the Intergovernmental Committee for Science and Technology for Development.

-- Intergovernmental Oceanographic Commission (IOC): A subsidiary, semi-autonomous body of UNESCO, the IOC coordinates international marine science and ocean monitoring activities, including global sea-level observation and global climate research. It could be called upon to accelerate the limited activities now underway for collecting and exchanging data required for assessing climate change.

Environment

-- UN Environment Programme (UNEP): To promote and coordinate international cooperation in the field of the human environment and to provide general policy guidance for the direction and coordination of environmental programs within the UN. UNEP is also responsible for keeping under review the world environmental situation to ensure that international environmental problems receive appropriate consideration by governments.

-- Committee on Natural Resources: This Committee is under ECOSOC. It is to assist ECOSOC in the planning, implementation, and coordination activities in the UN system for the development of natural resources, as well as in selecting and following up priority questions of long-term problems and trends of worldwide significance in the field of natural resources.

-- Organization for Economic Cooperation and Development (OECD): The OECD's environment work is supervised by the Environment Committee (ENVCOM). The ENVCOM has two groups working on climate change studies -- the Group on Energy and the Environment and the Group of Energy Experts. These groups have been assigned projects on energy options for addressing climate change and on socioeconomic implications of climate change, respectively. Both of these projects will produce draft reports in 1989. The OECD generally promotes policies designed to achieve the highest sustainable economic growth and a rising standard of living in member countries, to contribute to sound economic expansion in non-member countries, and to contribute to the expansion of world trade on a multilateral, nondiscriminatory basis.

-- The OECD Development Assistance Committee (DAC) provides a forum for coordinating donor efforts to address environmental problems in developing countries. Initial DAC efforts developed recommendations for environmental assessments of all development projects. Subsequently, DAC's efforts have been expanded, and a special working has been set up on the environment (which will have its first meeting later this fall). The group's preliminary work plan gives high priority to helping developing countries participate in and/or implement provisions of major international agreements, including those on climate change, ozone depletion, hazardous wastes, and biological diversity.

General

-- United Nations General Assembly (UNGA): The UNGA may discuss any questions or matters within the scope of the UN Charter or relating to the powers or functions of any organ provided for in the Charter. It may make recommendations to UN members or to the Security Council on any such questions or matters except on disputes or situations in respect of which the Security Council is currently exercising its functions.

-- United Nations Security Council: The Security Council has primary responsibility for the maintenance of international peace and security. The functions of the council fall mainly into two topics: pacific settlement of disputes; and action with respect to threats to the peace, breaches of the peace, and acts of aggression.

-- Economic and Social Council (ECOSOC): ECOSOC makes or initiates studies and reports with respect to international economic, social, cultural, educational, and health matters. It makes recommendations on such matters to the UNGA, to UN members, and to specialized agencies. It prepares draft conventions for submission to the UNGA on matters within its competence and calls for international conferences on such matters.

-- General Agreement on Tariffs and Trade (GATT): The GATT is the basic multilateral instrument that sets out agreed rules for international trade. Obligations of GATT members would apply to transactions in the area of global climate change.

Population

-- UN Population Commission: This Commission was established by ECOSOC to study and advise ECOSOC on population changes and their effect on economic and social conditions and other demographic questions.

-- UN Population Fund (UNFPA): Established under UNDP to promote awareness of the social, economic, and environmental implications of national and international population problems, as well as possible strategies to deal with them, and to provide sustained assistance to developing countries to deal with population problems.

Funding/Technical Assistance

-- UN Capital Development Fund (UNCDF): To assist developing countries through grants and loans, particularly long-term loans made free of interest or at low interest rates. Assistance is directed toward achieving accelerated and self-sustained growth of the economies of the poorest developing countries and is oriented toward the diversification of their economies, with due regard to the need for industrial development and using light capital technologies as a basis for economic and social progress.

-- UN Development Program (UNDP): To provide systematic and sustained assistance in fields essential to technical, economic, and social development of the developing countries. One of the trust funds under UNDP is the UN Fund for Science and Technology for Development.

-- IAEA Technical Assistance Fund: To support technical cooperation activities in developing countries related to the use of nuclear energy for peaceful purposes.

-- International Fund for Agricultural Development (IFAD): To mobilize financial resources and make them available on concessional terms for agricultural development in developing countries, particularly for projects specifically designed to improve food production systems in the poorest food deficient regions. Jointly funded by OPEC and OECD members.

-- UN Industrial Development Organization (UNIDO): To promote and accelerate industrialization in the developing countries. UNIDO works with the private sector and encourages investment as a means of fostering industrialization.

-- Colombo Plan for Cooperative Economic and Social Development in Asia and the Pacific: To assist in the economic development of Asia and the Pacific through exchanges of views on problems of technical assistance, collection of information on technical assistance programs undertaken by its members on a bilateral basis, and the encouragement of developing members to become donors of capital and technical cooperation assistance to other members.

-- Consultative Group on International Agricultural Research (CGIAR): To provide and coordinate funding for a network of international agricultural research institutes, e.g., the International Rice Research Institute (Philippines), the International Institute for Tropical Agriculture (Nigeria), the International Center for Tropical Agriculture (Colombia).

-- International Bank for Reconstruction and Development (World Bank): Although originally created to assist in financing the rebuilding of nations devastated by World War II, the Bank's main objective now is to lend for productive projects that will lead to economic growth in less developed member countries.

-- International Development Association: To promote economic development by providing financing to less developed countries on much more concessionary terms that those of conventional loans. It is designed especially to finance projects in countries that are not able to service loans from the World Bank.

-- Regional Development Banks: These include Inter-American, Indus Basin, African, Andean, Asian, Caribbean, Arab, Central American, European, OPEC, and Nordic.

-- International Finance Corporation (IFC): The IFC invests in productive private or partly governmental enterprises in association with private investors, with the aim of promoting the growth of the private sector and assisting productive private enterprises in developing countries.

Human Settlements

-- UN Centre for Human Settlements (Habitat): Promotes international cooperation in the field of human settlements in order to enhance countries' efforts to solve their problems and to increase resources available to developing countries. The Centre has three operating divisions: Research and Development (research on innovative ideas for human settlements developments); Technical Cooperation (project-based technical assistance to developing countries); and Information, Audio Visual and Documentation, (information collection and exchange channel).

-- Commission on Human Settlements: This Commission is under ECOSOC. It is to assist regions in increasing and improving their own efforts to solve human settlements problems, to promote greater international cooperation to increase the resources of developing countries.

Agriculture

-- Food and Agricultural Organization (FAO): To raise level of nutrition and standards of living, to secure improvements in the efficiency of production and distribution of all food and agricultural products, and to better the condition of rural populations (e.g., through dissemination of information and furnishing of technical assistance to governments).

-- Inter-American Institute for Cooperation on Agriculture: Member states promote and support agricultural development in their countries, including education, research, planning, science, and technology.

-- International Tropical Timber Organization (ITTO): To provide an effective framework for cooperation and consultation between tropical timber producing and consuming countries, with a view to promoting the expansion of trade. Seeks to promote research and development aimed at improving forest management; to encourage reforestation; and to encourage national policies aimed at sustainable utilization and conservation of tropical forests and at maintaining the ecological balance in the regions concerned.

Energy

-- International Atomic Energy Agency (IAEA): To seek to accelerate and enlarge the contribution of nuclear energy to peace, health, and prosperity throughout the world.

-- International Energy Agency (IEA): This international organization has programs designed to promote reduced dependence on oil imports and enhanced energy security through energy diversification, energy conservation and efficiency, and promotion of alternative energy fuels. Programs include annual reviews of member country energy policies, technical analyses and information exchange, and collaborative R&D programs on various energy technologies.

-- Nuclear Energy Agency (NEA): The NEA, a semi-autonomous agency under the OECD, is primarily responsible for developing technical policy guidance in the field of civilian nuclear power. Specific activities include: the coordination of R&D projects among national government agencies, technical information exchanges, and the preparation and dissemination of related nuclear studies and publications. The subjects of primary interest include nuclear safety, waste management, and radiation protection.

Judicial

-- International Court of Justice (ICJ): The ICJ is the principal judicial organ of the UN. Its principal function is to decide, in accordance with international law, such cases as are submitted to it by member nations.

Regional Economic Cooperation Organizations

-- These include:

U.N. Regional Economic Commissions
- Economic Commission for Africa (ECA)
- Economic and Social Commission for Asia and the Pacific (ESCAP)
- Economic Commission for Europe (ECE)
- Economic Commission for Latin America and the Caribbean (ECLAC)
- Economic and Social Commission for Western Asia (ESCWA))

European Economic Community
Organization for Economic Cooperation and Development
Organization of American States
COMECON
Andean Common Market
Caribbean Community
Economic Community of West African States
Organization of African Unity
ASEAN
South Asia Regional Council
South Pacific Forum

Domestic Legal Mechanisms Potentially Relevant to Climate Change

-- It would be useful for the RSWG to compile an inventory of types of legal mechanisms that could be used at the domestic level to implement responses to climate change.

-- An inventory would include not only those legal mechanisms explicitly directed at the climate change issue (if any), but also those that are related to the issue but based on other grounds (such as those directed at energy efficiency) and those that could be made relevant, such as air pollution controls.

-- A preliminary outline of potentially relevant mechanisms might include:

I. General

A. Environmental assessment requirements

B. Government information dissemination programs

II. Emission Reduction

A. Environmental Regulation

1. Control of air emissions (stationary sources, mobile sources, consumer products)

a. national ambient air quality standards

b. level of air emissions requirements

c. best available technology requirements

d. operating standards

e. labeling requirements

2. Control of chemicals and toxics

B. Energy Regulation

1. Industrial efficiency standards

2. Vehicle and other product efficiency standards

3. Alternative energy sources (hydro, solar, geothermal, wind, nuclear)

4. Economic incentives to reduce consumption of fossil fuels

5. Building codes

6. Standards for government-financed construction

7. Consumer rebates for efficient appliances

C. Transportation regulation

1. Highway construction

2. Mass transit

3. Transportation planning

D. Agriculture regulation (methane emissions)

E. Human Settlement Planning

F. Population Planning

G. Government Information Dissemination Programs

II. Affecting Sinks

A. Forestry (e.g., logging restrictions, reforestation requirements)

B. Land use planning (cluster developments, greenbelts, parks)

C. Acquisition/management of public lands

III. Adaptation

A. Coastal zones

1. Setback laws

2. Land acquisition/open space dedication/purchase of development rights

3. Building codes

4. Insurance (limits in vulnerable areas, requirements on relocation/rebuilding)

5. Incorporation of potential sea-level rise into governmental and private infrastructure planning and development

6. Filling coastal lands

B. Water resource management

1. Allocate water resources to their highest economic uses through greater use of market pricing

2. Develop alternative water sources

3. Restrictions on withdrawal of water from coastal aquifers (to slow salinization)

4. Desalinization processes for industrial use and human consumption

C. Agriculture

1. Technical assistance to farmers

2. Encouraging shifts to different crops

IV. Tax burdens, tax incentives, price supports, investment guarantees, grants as they relate to any of the above

V. Other mechanisms (or aspects of above) that relate to climate change abroad

A. Debt-for-nature swaps

B. Environmental assessment requirements for actions having effects abroad

C. Development assistance programs

Elements of a Framework Convention on Global Climate Change

General Principles

1. A framework convention on global climate change should be drafted to be amenable to adherence by a significant majority of the world's countries, including those comprising a significant majority of the world's population and those whose actions are significantly influencing atmospheric concentrations of CO2, methane, and other greenhouse gases. As such, the negotiating process to develop the convention should have as an explicit objective the broadest possible participation.

2. The framework convention should generally follow the model of the 1985 Vienna Convention for the Protection of the Ozone Layer (the "Vienna Convention").

3. The convention should provide an institutional framework for ongoing assessment of global climate change and discussion of possible responses. It should also provide a legal framework under which future specific response measures could be subsequently developed and agreed.

4. The convention's twin goals should be to provide a framework for: 1) increasing our understanding of the scientific aspects of global climate change and its potential impacts; and 2) protecting social, environmental, and economic well-being from adverse impacts likely to result from climate change.

5. The framework convention should provide for cooperation with competent international bodies to implement effectively its objectives.

6. The framework convention should take into account the need to involve, as well as assist, developing countries in addressing global climate change issues.

Convention Elements Implementing General Principles

-- The framework convention will most likely gain the adherence of the largest number and widest array of countries if it contains broad principles of cooperation rather than complex or potentially contentious provisions (such as provisions on liability, establishment of a trust fund, or enforcement measures), and if it contains provisions to deal with the special position of developing countries, as discussed below.

-- The convention should track the Vienna Convention in that it should be a framework convention (i.e., one that includes general principles of cooperation but does not itself set forth emissions targets and timetables) and should generally contain the same kinds of elements (e.g., general obligations, cooperation in research and monitoring, exchange of information, conference of the parties, secretariat, provision for adoption of protocols).

-- The convention should provide an institutional framework for cooperation by establishing a Conference of the Parties and a Secretariat, along the lines of the Vienna Convention. It should serve as a legal framework for future agreed measures by providing for the adoption of protocols and/or the use of other legal and institutional mechanisms. The use or amendment of existing legal or institutional arrangements might be particularly appropriate in the case of region-specific responses.

-- The terminology of the framework convention should reflect its twin goals and should not, as is sometimes suggested, refer to "protecting the climate". Protecting the climate per se is not our objective; rather, our objective is to protect social, environmental, and economic well-being from the adverse effects likely to result from global climate change. Further, adaptation measures (as opposed to limitation measures) are not aimed at "protecting the climate".

-- The framework convention should implement its twin goals by generally adopting the conceptual approach taken by the IPCC. Thus, the convention should focus on cooperation in 1) assessing the relevant scientific information related to global climate change; 2) assessing potential impacts of global climate change and their likelihoods; and 3) formulating and evaluating appropriate response measures, on the basis of such assessments as well as social, economic, and environmental factors and cost effectiveness.

-- With respect to the assessment of information and impacts, the framework convention should provide for the exchange of data, including, inter alia, data related to atmospheric chemistry, climate, sea level and river flow, energy supply (coal, oil, gas, nuclear power, biomass, solar, wind), energy end use (automobile production, residential/commercial appliance data), agriculture (rice production, fertilizer production, cattle, sheep goats), and forest acreage (acreage cleared/reforested/trees planted). There should be open access to such data. The parties should also draw upon the expertise of existing international organizations.

-- In addition, the framework convention should go beyond assessment of information (to which the IPCC's work is limited) by calling for enhanced cooperation in producing information. In the particular case of scientific information, the convention should provide for coordinated monitoring of evolving phenomena and coordinated research to improve knowledge about the origins, mechanisms, and effects of global climate change. Cooperation in monitoring should involve the planning, standardization, collection, analysis, and dissemination of appropriate information, utilizing as far as possible existing national and international activities. The results of the IPCC's inventory of current monitoring systems should be the basis for developing provisions on monitoring.

-- Because enhanced cooperation in monitoring is vital to the process of scientific assessment, such cooperation should begin immediately upon entry into force of the convention rather than wait for elaboration in a subsequent protocol or other legal arrangement. (It could, for example, be the subject of an original annex to the convention.)

-- The framework convention should provide for the establishment of expert panels (either ad hoc or standing) to collect, analyze, and report to the parties on relevant scientific, technical, environmental, social and economic information referred to above. In the case of scientific information, periodic updates approximately every three years would probably be appropriate.

-- On the basis of such information, the parties will be in a position to develop and evaluate possible response measures. Measures that are agreed to may be implemented through various means. They may be contained in protocols to the convention (although the convention would not impose any obligation on the parties to join any protocol). Alternatively, as noted above, agreed measures may also be implemented by amending existing legal arrangements, using existing institutional arrangements, or creating new legal or institutional arrangements. Agreed measures with respect to the production and consumption of CFCs should be implemented within the framework of the Vienna Convention and its Montreal Protocol.

-- Financial issues are too complex to be dealt with in the framework convention. However, the convention might establish a working group on financial implementation measures that could be charged with preparing a report as expeditiously as possible for the Conference of the Parties to consider.

-- In terms of taking into account the special position of the developing countries, the framework convention should go beyond the IPCC's work in another important respect, namely it should provide for cooperation in the development and transfer of technologies to limit or adapt to climate change. The development and transfer of technologies to limit emissions of greenhouse gases, such as energy end-use and supply techniques, CFC substitutes, and agricultural and forestry practices, will be critical to the implementation of limitation response strategies. Similarly, the development and transfer of technologies to adapt to global climate change, such as structural and non-structural coastal management techniques and practices, will be critical to the implementation of adaptation strategies. (The principles and specific procedures might be elaborated in an original annex to the convention. Further, a special working group on technology transfer might be established.)

-- Finally, it is currently premature to consider the subject of possible protocols and other agreed response measures, the order in which they might be taken up, and whether there will be linkage between various agreed measures. The IPCC has yet to complete its interim report (due in November 1990); in addition, the parties to the framework convention will continue to consider the appropriateness and timing of various response measures.

1/1 — Case for replacing protocols with sampling slips

CLOSE HOLD

THE WHITE HOUSE

WASHINGTON

December 14, 1989

MEMORANDUM FOR INTERESTED WHITE HOUSE STAFF

FROM: KENNETH P. YALE

SUBJECT: Reforestation Initiative

Thank you for the time you have spent reviewing and commenting on the previous editions of the issue paper.

Attached you will find the final paper. There will be some carbon sequester numbers added for comparison purposes.

I do apologise for the delays in arranging a DPC meeting. However, the additional time has allowed us to put some finishing touches on the paper. A meeting of the DPC has now been set for Monday December 18 and we will try to send this paper out by noon today, Thursday December 14.

Please feel free to call if you have any questions.

4:00

attachment

CLOSE HOLD

12-14-89 8:00 AM

December 14, 1989

MEMORANDUM

FROM:

SUBJECT: Reforestation Initiatives

Issue:

The parameters and details of an Administration initiative for trees.

Background:

The President is committed to wise stewardship of our nation's natural resources. In the book Building a Better America, the President noted the environmental and recreational significance of our parks, forests, and similar areas. As part of this commitment, the President has long advocated reforestation. A White House fact sheet dated September 18, 1989 noted the President's personal interest in planting trees. The emphasis on reforestation also has implications for international environmental issues, specifically global change.

In 1988, the President stated he would combat the greenhouse effect with the "White House effect." The June 1989 Paris Economic Summit highlighted environmental issues, including climate change. The final summit communique called for "adoption of substantial forest management practices." In November 1989, the U.S. joined 70 nations in signing the Noordwijk Declaration. Although not a binding document, signatory countries recognized the need to stabilize the emissions of greenhouse gases as soon as possible and agreed that it is timely to explore targets for CO_2 emissions reductions. Also noted in the declaration was the importance of reforestation.

There is substantial scientific consensus and public concern over the adverse effects that atmospheric increases in "greenhouse gases," such as carbon dioxide (CO_2), methane (CH_4), and chlorofluorocarbons (CFCs), are likely to have on the global climate. Such gases come from industrial and natural sources, as well as from land use changes such as deforestation. CO_2 accounts for less than half of greenhouse emissions, yet it is politically controversial, and one of the major issues under discussion in international environmental negotiations. A small reforestation program may establish U.S. leadership and give added credibility to any proposal we may put forth regarding large-scale, global reforestation. Unilateral adoption of a

large scale program, however, could reduce our leverage by giving away something with which we might bargain.

The United States contributes 23 percent of the total worldwide fossil fuel CO_2 emissions (not including the effects of tropical deforestation), although its share of the total has been and is expected to continue rapidly to decline. In absolute terms, U.S. CO_2 emissions from 1973 through 1987 have been essentially flat, with the emissions average during that time period equal to the 1972 level. Unilateral U.S. action regarding CO_2 emissions would produce trivial results. Analysis of a wide range of emission scenarios in which the U.S. acts unilaterally to reduce CO_2 emissions by 10 percent in 1995, shows that the expected worldwide doubling of CO_2 in the mid-21st century is delayed by only 2 to 6 years.

There are substantial scientific uncertainties about the actual strength, timing and character of human and nature induced climate change. Nevertheless, planting trees, <u>especially</u> where justified by more certain non-climate benefits, can be an effective way to reduce levels of CO_2 while obtaining other benefits. Of course, CO_2 taken up by trees is sequestered only until they are burned or decompose.

Tree planting can provide other environmental benefits, including improved air quality, increased water quality, and reduced soil erosion. It can also result in improved wildlife habitat and enhanced opportunities for outdoor recreation.

<u>Current Reforestation Activities</u>:

In FY 1988, approximately 3.4 million acres were planted in trees or seedlings on public and private lands. Total trees planted exceeded 2.3 billion (see figure 1).

Land available for planting trees can be divided into agricultural and non-agricultural. In the agricultural category, land is used for crops and pasture. Pastureland is usually economically marginal, environmentally sensitive and frequently erodible if overgrazed. Agricultural land offered for tree-planting is most likely to be idle, very poor land, owned by individuals who do not depend on farming for most of their income. Non-agricultural land includes private (industrial or non-industrial) and public (Federal, state and local) forestland.

Nearly three fourths of the productive timberland in the U.S. lies on private lands. Seventy-five percent of this timberland is owned by non-commercial, small woodlot owners. The current growth and opportunity for future growth in tree planting is on agricultural and other privately owned land, especially on small woodlots after timber harvests.

Figure 1. Tree Planting By Ownership - FY 1988

Federal Government	Acres	Trees Planted in Thousands	Percent of all Planting
National Forests	293,271	199,000	8.6
Dept. of the Interior	40,482	27,000	1.2
Other Federal Agencies	10,738	7,500	0.4
Total	344,491	233,500	10.2
Non Federal Public			
State Forests	59,323	40,000	1.7
Other State Agencies	13,520	9,200	0.4
Other Public Agencies	12,378	8,400	0.4
Total	85,221	57,600	2.5
Private			
Industrial Owners	1,389,716	945,000	40.9
Small Owners	1,575,050	1,017,000	46.4
Total	2,964,766	2,016,000	87.3
Grand Total	3,394,478	2,305,100	100.0

Both public and private sector programs are involved in tree planting. Most financing and technical assistance for non-industrial, private tree planting is provided by the Department of Agriculture and their Forestry Service. Actual planning and planting are undertaken by state foresters in the 50 states and 3 territories. Private sector organizations, such as the American Forestry Association ("Global Releaf", National Urban Forestry Council) and the National Arbor Day Foundation ("Tree City USA", Trees for America), also provide technical assistance.

USDA Tree Planting

The Conservation Reserve Program (CRP), operated by USDA, is designed to retire environmentally sensitive and economically marginal agriculture-related land to soil conserving cover, including forest through 10 year contracts with farmers. To the extent practicable, 12.5 percent of this land is to be devoted to trees. The land can reconvert to agricultural uses at the end of the contract period.

Technical responsibility for CRP planting is assigned to the Forest Service, and technical service to landowners is provided

by state forestry personnel. The CRP contributed 245,000 acres of trees planted in 1989 (167 million trees/year and over 1.3 billion trees since the beginning of the program). The current CRP authorization expires at the end of the 1990 crop year. Some portion of the 82.1 million acres of crop and pasture land which meet the criteria of environmental sensitivity could be included in a tree planting CRP-like program. Additional tree planting could be linked to existing crop subsidy programs. This concept is not addressed in the current discussion.

Current Federal programs targeting non-Federal forest lands include the Forest Incentives Program (FIP) and a program of technical assistance provided through the Forest Service. FIP provides about $12 million per year for technical assistance and Federal 50/50 cost share for reforestation, timber stand improvement, and other forest needs on non-industrial private forest lands (NIPF). The Forest Service annually funds about $5 million for direct technical assistance through State forestry agencies to NIPF landowners. These programs are used for planting on non-Federal forestlands, such as non-industrial private forests, and on crop and pasture lands on a cost-shared basis, without rental payments.

Reforestation of National Forest lands totaled 300,000 acres in FY 1988. Nearly 200 million trees were planted. Planting is done following: timber harvest; natural disasters such as fire, insects and disease; and previously unsuccessful reforestation. Some sites regenerate naturally without special treatment or investment. Others require site preparation to encourage natural regeneration or preparation for seeding or planting. Total Federal cost for Forest Service reforestation in FY 1988 was about $250 million.

The Urban and Community Forest Program provides technical assistance for community forests in cities and towns. It is designed to improve soil, water and air quality and is funded through the USDA Forest Service.

Other Federal Tree Planting

The Department of the Interior and other agencies reforested about 51,000 acres in FY 1988, with 34 million trees. Most is done by the Bureau of Land Management (BLM), principally in Oregon. BLM spent over $22 million in FY 1988 for reforestation.

Any new program could be a mix of non-Federal forestlands and agricultural lands. Some agricultural land can be attracted with cost-sharing, while other land can only be attracted with a CRP-like program. While planting costs themselves are moderately lower on agricultural lands than on non-industrial forestland, if CRP like type annual rentals were required, the total cost would be much higher. Furthermore, land which would require a CRP-

type rental would be likely to revert to its previous use after the full rental period is over.

Congressional Activity:

There are several legislative proposals that would increase tree planting, four in the Senate and one in the House. The Farm Conservation and Water Protection Act of 1989 (S. 970, the "Fowler Bill") is the probable vehicle for any action in the near future. It is a forerunner of the 1990 Farm Bill and contains specific authority to increase tree planting through a CRP-like program, directing a greater percentage of lands under the program to be planted with trees, instead of grasses (currently only 6.7 percent of CRP lands are planted with trees.)

Options For a Tree Planting Initiative:

Prior to the Paris Economic Summit, the Environmental Protection Agency proposed a major commitment to tree planting to reduce the effects of global warming. Subsequent to the Summit, a task force consisting of DOE, EPA, OPD, USDA, and USDI met to further develop and refine options for a reforestation initiative, in consultation with other agencies (including CEA and DOT). According to the interagency task force, the goals of a reforestation initiative include:

- Offset increases in U.S. CO_2 emissions.
- Demonstrate U.S. commitment to worldwide forest management and address global change.
- Provide leadership to support conservation in the U.S. through public-private partnerships and volunteer approaches to tree planting and forest management.
- Improve forest management and provide multiple environmental and economic benefits.

Several options are presented below. All have some volunteer component. They differ in the amount and type of Federal programmatic activity. The FY 1991 Budget now includes Option #3 as a part of a proposed initiative, with budgetary costs entirely offset by revenue from user fees to be paid into an environmental endowment fund.

Community Trees/Volunteer Program

Provides Federal Government leadership, coordination, and promotion, designed to stimulate an all-out volunteer effort to plant an average of 30 million trees annually. It includes provisions for technical assistance to make tree planting effective.

It would expand the existing USDA Forest Service Urban and Community forestry network of Federal-State-Local government agencies, organizations and community activists and generate private contributions of funds and volunteer labor to sustain the planting and maintenance of urban and community trees.

Federal funds would be allocated through state forestry agencies and as direct grants to conservation and citizen organizations. State forestry staff or contract forestry consultants would provide technical assistance and program coordination activities. It is anticipated that national leadership would be provided by a Presidential Blue Ribbon Commission, ensuring proper coordination between Federal, state and local efforts. A Volunteer Trees Foundation under Commission oversight could promote and organize private contributions for tree planting.

This option would provide high non-climate payoffs, such as savings on residential air-conditioning, or improved recreational opportunities on community lands. Furthermore, it would reverse the present "deforestation" trend occurring in America's cities and towns, where only one tree is now being planted for every four that die or are removed. Through personal involvement and commitment of the volunteers, the option would result in a renewal of public support and commitment to improving the environmental, economic, and social well-being of the nearly 40,000 cities, towns, and communities in the United States.

Annual trees planted: 30 million trees

Federal Costs:
Total (20-year): $1.0 billion
First year: $50 million

Est. Average Annual Federal cost/tree: $1.67

Option I - Current Agricultural Land Program

The Conservation Reserve Program, emphasizing Federal rental payments as an incentive to set aside land for tree planting. It is designed to retire environmentally sensitive and economically marginal agriculture-related land to soil conserving cover, such as forest and grasses.

Technical responsibility for CRP planting is assigned to the Forest Service, and technical service to landowners is provided by state forestry personnel.

Includes the following, along with annual trees planted or improved:

A. Community Trees/Volunteer program: 30 million trees

B. Continue Current CRP: 318 million trees

-- 50/50 cost share for establishment, technical assistance, and annual rental payments by the Federal government.

-- 12 million acres of economically marginal, environmentally sensitive agricultural land in 20 years.

- o 8 percent cropland (more expensive to enroll)
- o 92 percent pastureland (less expensive to enroll)

Annual Trees Planted/Improved: 348 million trees

Federal Costs:

A.	Total (20 year):	$1 billion
	First year:	$50 million
B.	Total (35 year):	$2.6 billion
	First year:	$ 26 million
	Total A to B (20/35 years)	$3.6 billion

Est. Average Annual Federal cost/tree: $0.52

Pros

- o Maintains existing USDA/State delivery system for tree planting developed under CRP, no build-up in delivery system is necessary.
- o Very modest commitment to offsetting CO_2 emissions.
- o Additional tree planting keeps prices stable and avoids negative impact on forest industry.
- o Small effect on agricultural commodities markets.

Cons

- o CRP component requires new legislative authorization.
- o High cost of rental payments, committing Federal participation for 35 years with high total costs. Inefficient as it requires the Federal government to pay landowners to convert from one land use (crop or pasture) to another use (forest), rather than to simply improve a use currently in place, such as on non-Federal forest land. Actual experience under the CRP for converting cropland to trees shows that costs exceed estimates. A survey of CRP

participants who planted trees (about 6 percent of the CRP program) found that landowners would require rental rates 25 percent higher than they accepted the first time around to induce them to convert more cropland to trees under 10-year contracts.

- o Some local negative effects on agricultural input industries.

- o There is a very high risk that CRP enrolled agricultural lands will be reconverted into row crop or pasture production at the end of the contract period, eliminating the expected CO_2 and other benefits despite the costs.

- o A tree planting initiative that puts 76 percent of the funding into technical assistance and rental payments and only 24 percent into actual tree planting is neither credible nor efficient.

Option II - Agricultural Land Emphasis

This is a CRP-like program, emphasizing Federal rental payments as an incentive to set aside land for tree planting.

Includes the following, along with annual trees planted or improved:

A. Community Trees/Volunteer program: 30 million trees

B. Agricultural Land Initiative: 700 million trees

-- Based on CRP model (50/50 cost share for establishment, technical assistance, and annual rental payments by the Federal government).

-- 20 million acres of economically marginal, environmentally sensitive agricultural land in 20 years.

  - o 8 percent cropland (more expensive to enroll)
  - o 92 percent pastureland (less expensive to enroll)

C. Non-industrial Forestland Program: 230 million trees

-- Based on CRP model (50/50 cost share for establishment and technical assistance and annual rental payments by the Federal government for private, non-industrial forestlands).

-- 10.7 million acres of non-Federal forestland tree planting and forest stand improvement in 20 years.

Annual Trees Planted/Improved: 960 million trees

Federal Costs:

A.	Total (20 year):	$1 billion
	First year:	$50 million
B & C.	Total (35 year):	$8.2 billion
	First year:	$142 million
Total A to C (20/35 years)		$9.2 billion

	1991	1992	1993	1994	1995
Budget year costs	142	175	205	245	270

Est. Average Annual Federal cost/tree: $0.49

Pros

- Demonstrates U.S. commitment to offsetting CO_2 emissions.
- Reduces consumer lumber prices from what they would be without a trees initiative and still gives tree growers substantial earnings.
- Small effect on agricultural commodities markets.

Cons

- CRP component requires new legislative authorization.
- High cost of rental payments, committing Federal participation for 35 years with high total costs. Inefficient as it requires the Federal government to pay landowners to convert from one land use (crop or pasture) to another use (forest), rather than to simply improve a use currently in place, such as on non-Federal forest land. Actual experience under the CRP for converting cropland to trees shows that costs exceed estimates. A survey of CRP participants who planted trees (about 6 percent of the CRP program) found that landowners would require rental rates 25 percent higher than they accepted the first time around to induce them to convert more cropland to trees under 10-year contracts.
- Some local negative effects on agricultural input industries. Some regional redistribution of the timber industry may result, from the West to the Southeast.
- It is doubtful that the acreage target can be met while holding cropland to only 10 percent of enrolled acreage. The cost of an agricultural lands program may be even higher than 47 cents per tree if a larger proportion of cropland is needed (rather than pastureland) to meet acreage targets.

- o There is a very high risk that CRP enrolled agricultural lands will be reconverted into row crop or pasture production at the end of the contract period, eliminating the expected CO_2 and other benefits despite the costs.

- o Fewer non-climate benefits under the agricultural component since erosion and water quality problems are less on pastureland (90 percent of the program) than on cropland.

- o A tree planting initiative that puts 76 percent of the funding into technical assistance and rental payments and only 24 percent into actual tree planting is neither credible nor efficient.

Option III - Non-Industrial Forestland Emphasis

An FIP-like technical assistance, cost-sharing program for private, non-industrial forestlands and agricultural land, with no CRP-like component. It is included in the FY 1991 Budget as a part of a new initiative. The costs would be fully funded by increased user fee revenues through an environmental endowment fund also proposed in the Budget.

It also includes funding of $35 million in the first year to capitalize a Volunteer Foundation or provide the Presidential Commission with funds for a challenge cost share program to leverage initial private funds for early, highly visible tree planting. The Community Trees/Volunteer program in the other options provides no funds for actual planting of trees. Instead, it funds technical assistance and coordination.

Includes the following, along with annual trees planted or improved:

A. Volunteer program: 30 million trees

B. Non-Industrial Forestland Initiative: 970 million trees

-- Based on current FIP (from 50/50 to 75/25 cost share for establishment and technical assistance for private, non-industrial forestland and agricultural land in rural areas).

-- Around 12 to 15 million acres of non-Federal forestland planting and forest stand improvement.

C. Forestry Stewardship Initiative:

-- Expand current stewardship program (partly 50/50 cost shared with states to provide a basic technical assistance capability in State Foresters offices, and partly 100 percent Federal program to reach the needed scale to support

all of the planting funded under A and B, above).

-- State forestry staff or contract forestry consultants assist land owners in developing property management plans.

Annual Trees Planted/Improved: 1 billion trees

A.	Total (20 year):	$700 million
	First year:	$35 million
B.	Total (20 year):	$1.8 billion
	First year:	$90 million
C.	Total (20 year):	$1 billion
	First year:	$50 million

Total A to C (20 years): $3.5 billion

	1991	1992	1993	1994	1995
Budget year costs	175	175	175	175	175
Offset from Environmental Endowment	-175	-175	-175	-175	-175
Net Deficit Impact	0	0	0	0	0

Est. Average Annual Federal cost/tree: $0.18

Pros

- o No new legislation is needed.
- o Low total costs, funds are allocated mainly to a more cost effective option: the Forestry Stewardship technical assistance program which leverages Federal and State funds, and small owner cost-sharing to improve the economics of some small owner investment. Allocates more funds to actual tree planting and improvement, rather than to rental costs under a CRP-type program.
- o Makes a trees initiative an integral part of a broader environmental initiative which stresses improving the outdoor environment of America in a number of ways.
- o Funds the budgetary costs of the Trees program almost entirely from user fees paid into an environmental endowment fund by those who use and have the most concern about protecting the high quality of the outdoor environment.
- o The Forestry Stewardship consolidates technical assistance from three programs: woodlot owners receiving Federal cost-sharing, woodlot owners assisted by separate State programs, and assistance to community governments and organizations. This consolidation should improve productivity and give

flexibility to allocate effort where the payoff in trees planted is highest.

- o Improved harvesting practices and replanting will help to ensure adequate regeneration of harvested stands on NIPF lands. This should help to lessen harvest pressures on Federal lands in future years.

- o Minor impact on food supply and agricultural input sector, would enhance timber supply without depressing stumpage prices.

Cons

- o Would have deficit impacts several times higher than the Volunteer Program alone, if offsetting receipts to the environmental endowment are not enacted, though substantially lower than other options presented here.

- o Principal program benefits beyond the Volunteer Program accrue to private, small woodlot owners, does not fully use available opportunity to plant on agricultural lands.

- o Requires a massive landowner behavioral response to a limited financial incentive (50/50 cost share). Private ownership investment funds and demand for cost sharing on non-industrial forest land may be insufficient to accomplish true annual acreage target over 20 year program. Cost share may have to be increased to 75 percent Federal.

- o Excludes farmers and ranchers from subsidy unless they own lands where it is economical to invest in tree planting on a 50/50 cost-sharing basis.

- o Will replant trees that should have been planted anyway.

Option IV - Enhanced Agricultural Lands Emphasis

An expanded CRP-like program, emphasizing Federal rental payments as an incentive to set aside land for tree planting, but at a much larger scale to offset additional CO_2 emissions.

Includes the following, along with annual trees planted or improved:

A. Community Trees/Volunteer program: 30 million trees

B. Enhanced Agricultural Land Initiative: 1.295 billion trees

-- Based on CRP model (50/50 cost share for establishment, technical assistance, and annual rental payments by the Federal government) but much larger scale.

-- 37 million acres of economically marginal, environmentally sensitive agricultural lands in 20 years.

  - o 20 percent cropland (more expensive to enroll)
  - o 80 percent pastureland (less expensive to enroll)

C. Non-industrial Forestland Program: 624 million trees

-- Based on CRP model (50/50 cost share for establishment and technical assistance and annual rental payments by the Federal government for private, non-industrial forestlands).

-- 26.8 million acres of non-Federal forestland tree planting and forest stand improvement in 20 years.

Annual Trees Planted/Improved: 1.95 billion trees

Federal Costs:

A. Total (20 year):	$1 billion
First year:	$50 million
B & C. Total (35 year):	16.2 billion
First year:	$237 million
Total A to C (20/35 years):	$17.2 billion

	1991	1992	1993	1994	1995
Budget year costs:	237	300	363	434	488

Est. Average Annual Federal cost/tree: $0.44

Pros

- o Highest level of CO_2 emissions offset. Most clearly establishes U.S. in a leadership role in tree planting to offset CO_2 while proposing actions likely to be less controversial than direct reductions of fossil fuel emissions. Could provide an example for other countries.
- o Includes a significant effort in all areas where major opportunities for tree planting exist - in urban and community locations, on agricultural lands, and on non-industrial private forests.
- o Greatest favorable effect on rural economies through creation of new employment opportunities and increased economic activity.

Cons

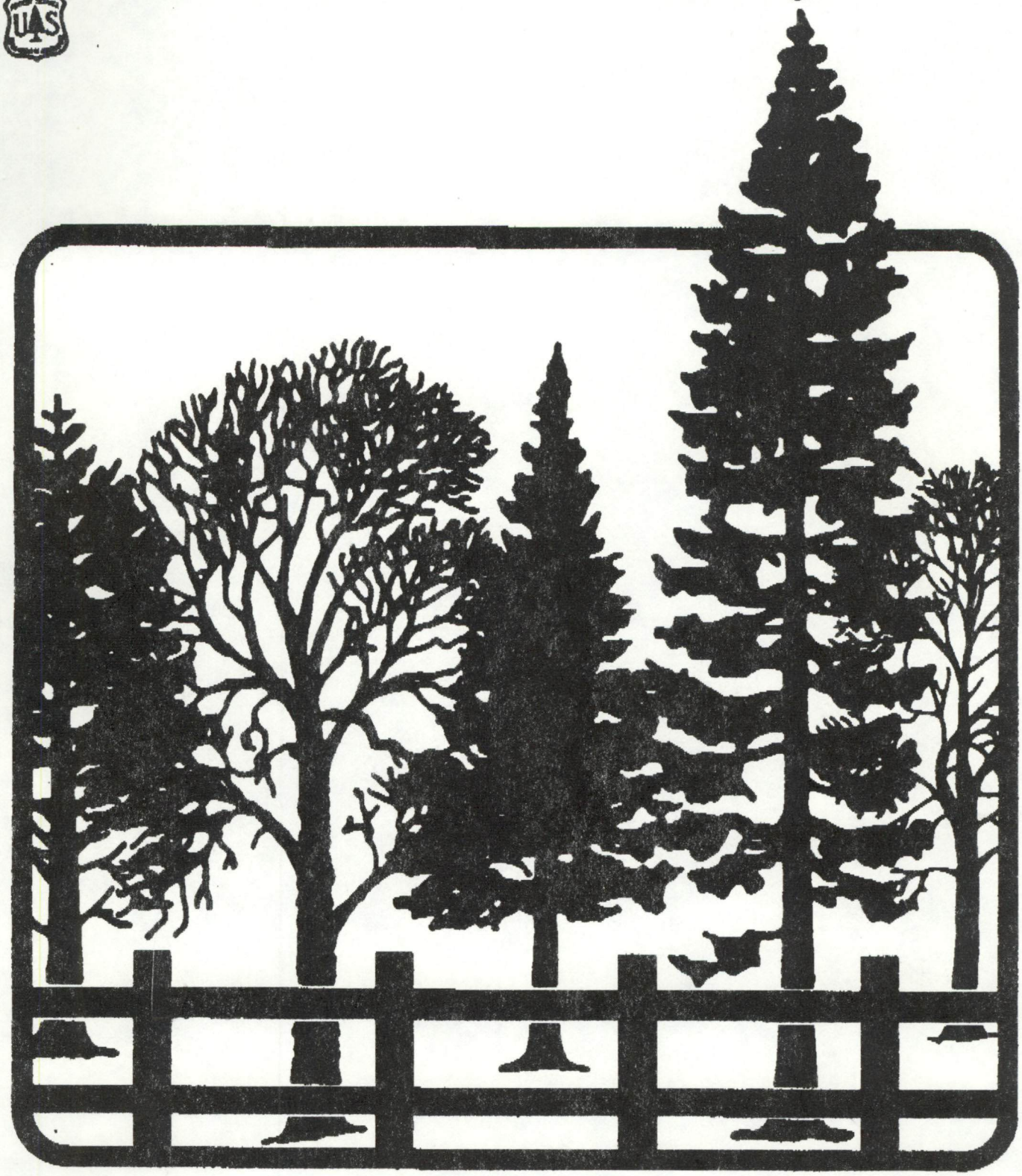
- o CRP component requires new legislative authorization.
- o Highest cost option, uses a CRP-like program, in order to attract a large amount of agricultural land. Inefficient as it requires payments to landowners at high Federal cost to convert from one land use (crop or pasture) to another use (forest), rather than to simply improve a use currently in place, such as on non-Federal forest land.
- o Commits Federal participation for 35 years with high total costs of $19.2 billion, a substantial portion of which is annual rental payments. (Although focus on pasturelands and forestlands will have much lower rental rates than CRP croplands). Actual experience under the CRP for converting cropland to trees shows that costs exceed estimates.
- o Non-climate benefits are unlikely to justify a costly program on this scale. Justification hence, depends on highly uncertain climate benefits.
- o Greatest negative impact on food production and timber supply and on agricultural input sector.
- o See Option II for additional cons.

United States Department of Agriculture

Forest Service

TREE PLANTING and FOREST IMPROVEMENT

To Reduce Global Warming



TREE PLANTING AND FOREST IMPROVEMENT TO REDUCE THE EFFECTS OF GLOBAL WARMING

The information and analysis on which this option paper is based was provided by a coalition of Federal Government Agencies, including the following:

Council of Economic Advisors

Department of Agriculture
- Office of the Secretary
- Agricultural Research Service
- Agricultural Stabilization and Conservation Service
- Cooperative State Research Service
- Economic Research Service
- Forest Service
- Soil Conservation Service
- World Agricultural Outlook Board

Department of Energy

Department of the Interior
- Bureau of Indian Affairs
- Bureau of Land Management

Environmental Protection Agency

Federal Highway Administration

Office of Management and Budget

Contents

TREE PLANTING AND FOREST IMPROVEMENT TO REDUCE THE EFFECTS OF GLOBAL CLIMATE CHANGE

Introduction

Scientific consensus and public concern are growing that atmospheric increases in "greenhouse gases," principally carbon dioxide (CO_2), will alter the global climate. While the eventual solution of the problem requires control of CO_2 emissions at their sources, an immediate opportunity exists to offset CO_2 increases through a tree planting and forest improvement program. Such a program could produce positive results for the Administration in the following areas:

1. Presidential Leadership.
2. Volunteerism.
3. Partnerships.
4. International Leadership.
5. Multiple Environmental Benefits.

Goals

- **To offset U.S. CO_2 emissions increases through a tree planting and forest improvement program.**
- **To demonstrate U.S. commitment to worldwide sustainable forest management and reduction of global warming. (Summit of the Arch Statement, Paris, France, 1989)**
- **To provide leadership and action in building the conservation spirit and ethic in the U.S. through cooperative public-private partnerships and citizen volunteer approaches to tree planting and forest management.**
- **To improve forestland management and produce multiple environmental and economic benefits from forests and community trees throughout the U.S.**

Situation

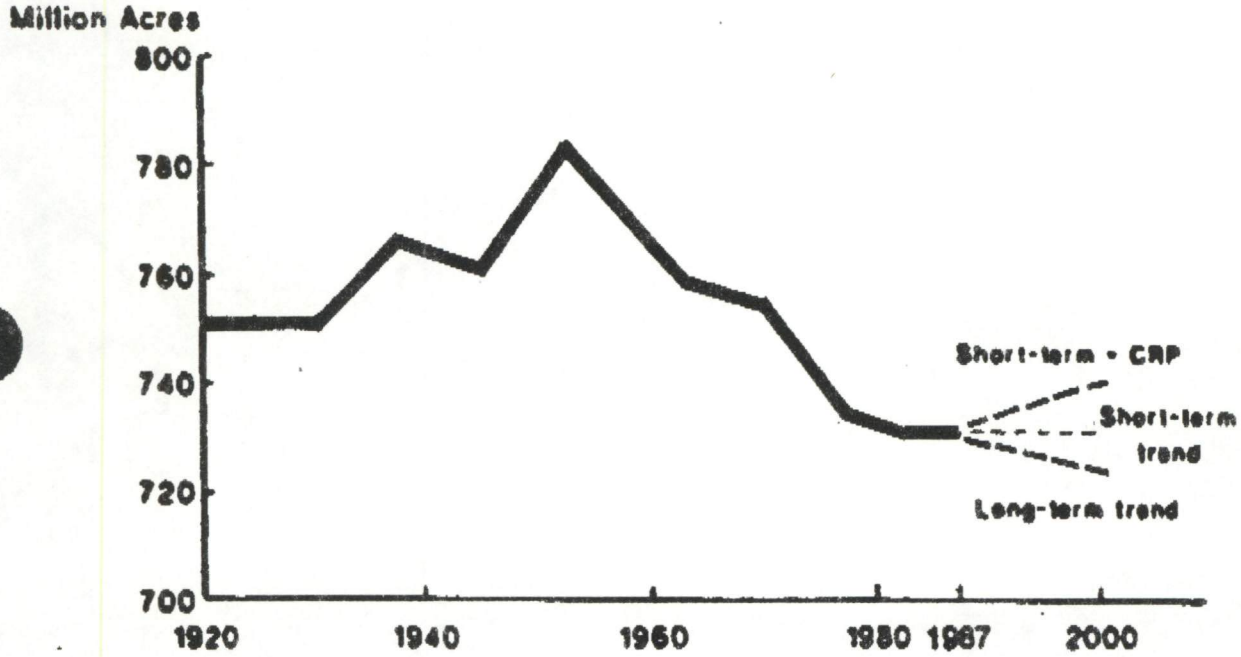
An analysis of a national program of sustained tree planting and forest improvement activities indicates the following key findings.

1. A Community Trees Program is essential. Urban and community forests are in decline. Community trees produce major benefits for the environment. The public is anxious to participate.
2. The Nation would benefit from additional forestland. A long-term downward trend is beginning to stabilize. Additional forestland would produce benefits and enhance the U.S. position in dealing with international issues regarding reforestation (See following table).
3. The USDA-Forest Service/State Forester cooperative tree planting delivery system is presently operating at a high level due to the Conservation Reserve Program. Transition into a new program could be effectively managed (See following table).
4. Economically marginal and environmentally sensitive agricultural lands are available for conversion to forestland. The levels of tree planting being proposed could be accomplished. Actual enrollment would depend on landowner willingness to participate (See following table).

Forestland Trends

- o The total U.S. land area is 2.3 billion acres.
- o It is estimated that in the year 1630 forestland area was 1.1 billion acres.
- o By 1920, clearing of forestland for agriculture and development reduced the area to 751 million acres. Since 1920, agricultural land abandonment and increased urbanization have produced the following trends in forestland area.

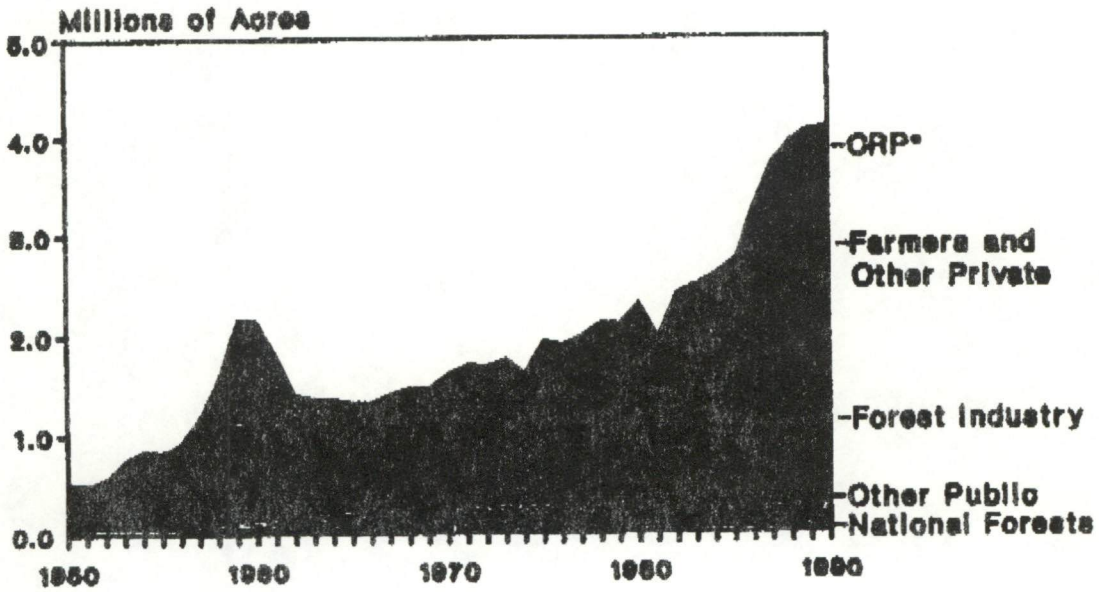
Area of Forest Land in the U.S.
1920 to 1987, with 10 - 20 Year Outlook



- o Long-term average trend since 1880 is downward - but with short-term cycles.
- o Both FS and SCS data show that forestland stabilized in the 1982 - 1987 period.
- o CRP has probably reversed the 1952 - 1987 decline.

Tree Planting in U.S.

Tree planting history and trends by ownership are shown in the following table. The trend has been upward since 1950, with major surges during the Soil Bank years and the current Conservation Reserve Program (CRP). Forest industry and public land tree planting are now stable and expected to remain that way. The current growth and opportunity for future growth is in the farmers and other private ownerships. This is consistent with the major categories of lands suitable and available for a Tree Initiative.



*2.2 Million Acres in CRP 8/86-10/89

**2.2 Million Acres in Soil Bank 1956-1962

Source-U.S. Forest Planting Report, U.S. Department of Agriculture-Forest Service (Annual Report)

Agricultural Related Land Availability

Only those acres that were classified as environmentally sensitive or economically marginal when used in agricultural production based on the 1982 SCS National Resources Inventory are considered as candidate acres for tree planting. Further, it is assumed that no more that 25 percent of the cropland acres and 50 percent of the pastureland acres in any county would be enrolled in a tree planting program.

As shown in the following table, the above criteria identifies 40.4 million acres of cropland and 41.7 million acres of pastureland in the major tree planting regions of the Nation. This provides an ample pool of environmentally sensitive and economically marginal agriculture related land available for tree planting.

	--- CROPLAND ---			--- PASTURELAND ---		
REGION	Total	Eligible	%	Total	Eligible	%
	(thousand acres)			(thousand acres)		
Southeast	18,214	5,077	28	12,275	5,643	46
Delta	21,925	2,884	13	12,137	5,991	49
Missouri	3,468	653	19	4,591	3,232	70
Texas	1,966	374	19	5,581	2,701	48
Appalachia	22,711	9,618	42	18,477	13,812	75
Northeast	17,258	8,529	49	8,820	5,498	62
Lake	43,924	13,284	30	9,895	4,862	49
TOTAL	129,466	40,419	31	71,776	41,739	58

Program Options

The following options provide the essential elements for a Presidential decision. They fall into two major aspects of Communities and Rural Areas. For comparison purposes the options are numbered consecutively.

COMMUNITIES

1. Community Trees-Volunteer Program

This option provides Federal Government sponsored leadership, coordination, and promotion, designed to stimulate an all-out volunteer effort to plant an average of 30 million trees annually in communities throughout the U.S. It includes provisions for technical assistance to make volunteer tree planting effective.

The general organizational framework of this option would include the following features:

- **Build on existing Federal Government networks with State forestry agencies and private sector associations and organizations.**
- **Establish a blue ribbon national panel of public and private sector leaders to promote partnerships.**
- **Establish a network of full-time State and community level volunteer program coordinators.**
- **Utilize existing community volunteer groups and encourage new coalitions of citizens to obtain maximum success.**
- **Provide technical assistance through State Forestry agencies and local government.**

RURAL AREAS

2. Continue Current Level (CRP) Planting

This option provides for a continuation of the current high level of tree planting (3.4 million acres annually-see earlier chart). The Conservation Reserve Program (CRP) contributes 600 thousand acres per year. Since the CRP expires at the end of the 1990 crop year, this option would replace and continue that amount of planting for a total of 12 million acres over 20 years.

3. Five Percent CO_2 Reduction

This option expands tree planting on agriculture related land to a total of 20 million acres or 1 million acres annually. It adds a component of non-Federal forestland planting and forest improvement amounting to 536 thousand acres annually for a total of 10.7 million acres.

4. Ten Percent CO_2 Reduction

This options expands tree planting on agriculture related land to a total of 37 million acres. It adds a larger component of non-Federal forestland planting and forest improvement amounting to 1.3 million acres annually for a total of 26.8 million acres.

This option is the same as the five percent option, but on a much larger scale. The critical factor is the expansion of agriculture related land to 37 million acres over the 20 year period.

5. Increased Cost-Sharing and Technical Assistance

This option expands the tree planting and forestland improvement activities accomplished under the Forestry Incentives Program (FIP) and the Agricultural Conservation Program (ACP). Currently these cost-sharing programs result in planting about 312,000 acres of trees annually and improvement of 67,000 acres of forestland productivity annually. Doubling these efforts along with a doubling of the technical assistance by USDA and its cooperators would result in 300,000 additional acres of tree planting. Since at least half of these acres would be on existing forestland, the overall contribution to carbon dioxide offset will be modest.

Public Forestland Option

In addition to the above options there is potential for a public forestland option. These are forestlands managed by Federal, State and County Governments. While this is a large area of forestland, it is essentially in good condition at present and making a major contribution to current levels of carbon sequestration and carbon dioxide emission reduction. An interagency team is presently evaluating these lands for possible inclusion in this program proposal. This potential is yet to be determined and could be added to the proposal at a later date.

Options Summary Table

The following table displays the basic information for each option as well as information on costs, key effects, and the pros and cons for each option.

ACTION PLAN

This basic Action Plan will apply regardless of the option(s) selected. A much more detailed action plan would be developed for the final program.

Leadership and Coordination

The [Secretary of Agriculture] will provide national leadership and coordination through the [Chief of the Forest Service]. An interdepartmental Task Force will be formed to provide overall Federal Government direction and guidance. The [Secretary of Agriculture] will chair the Task Force which will have representatives from the Environmental Protection Agency, Department of Interior, Department of Energy, Department of Defense, and others who contribute to the Federal effort. Consultation and coordination with State and local government and the private sector could be managed through committees, panels, and groups involving trade associations, the business community, civic groups, and others.

Program Delivery

The delivery system for this effort would call for a combination of the traditional governmental system with private sector efforts and the citizen volunteer movement. This approach has already been successfully demonstrated by efforts such as the "Touch America Program," and many state and local projects. This proposal expands the concept by a linkage to a global issue with a focus on the simple subject of trees. A closely related promotional and informational campaign entitled, "Global ReLeaf," is already under way under the auspices of the American Forestry Association.

The basic framework for delivery would be the USDA system, which reaches all land, communities, and people considered in the program options. The system would be expanded in cooperative approaches to all levels of government, private associations, businesses, and citizens groups. It would build on existing USDA Forest Service networks involving the National Association of State Foresters, the American Forestry Association, the National Arbor Day Foundation, the American Association of Nurserymen, and others. The system can reach out to the entire Nation.

Schedule

A possible general schedule would be as follows:

1990 - Announce, plan, and organize program within existing capability.
1991 - Major implementation. Possible link to the Administration's FY 1991 Budget which is now being developed.
1992 - People mobilized. Program in action.
1995 - Major accomplishments and results in full flow.
2000 - Ten year benchmark report. Turn of the century events.
2010 - Full benefits of trees being achieved. Worldwide situation improved.

Full on-the-ground implementation of a greatly expanded tree planting program would require several years to achieve. This is due to the time involved in expanding nursery capacity, tree seedling production, and transplant operations. Existing capability would suffice while the program gets organized.

COMMUNITY TREES

Proposal **Plant an average of 30 million trees annually during the next 20 years to stop the "deforestation" occurring in America's cities and towns and offset an additional 5.2 million tons of carbon dioxide emissions annually by the year 2010.**

Implementation Strategy:

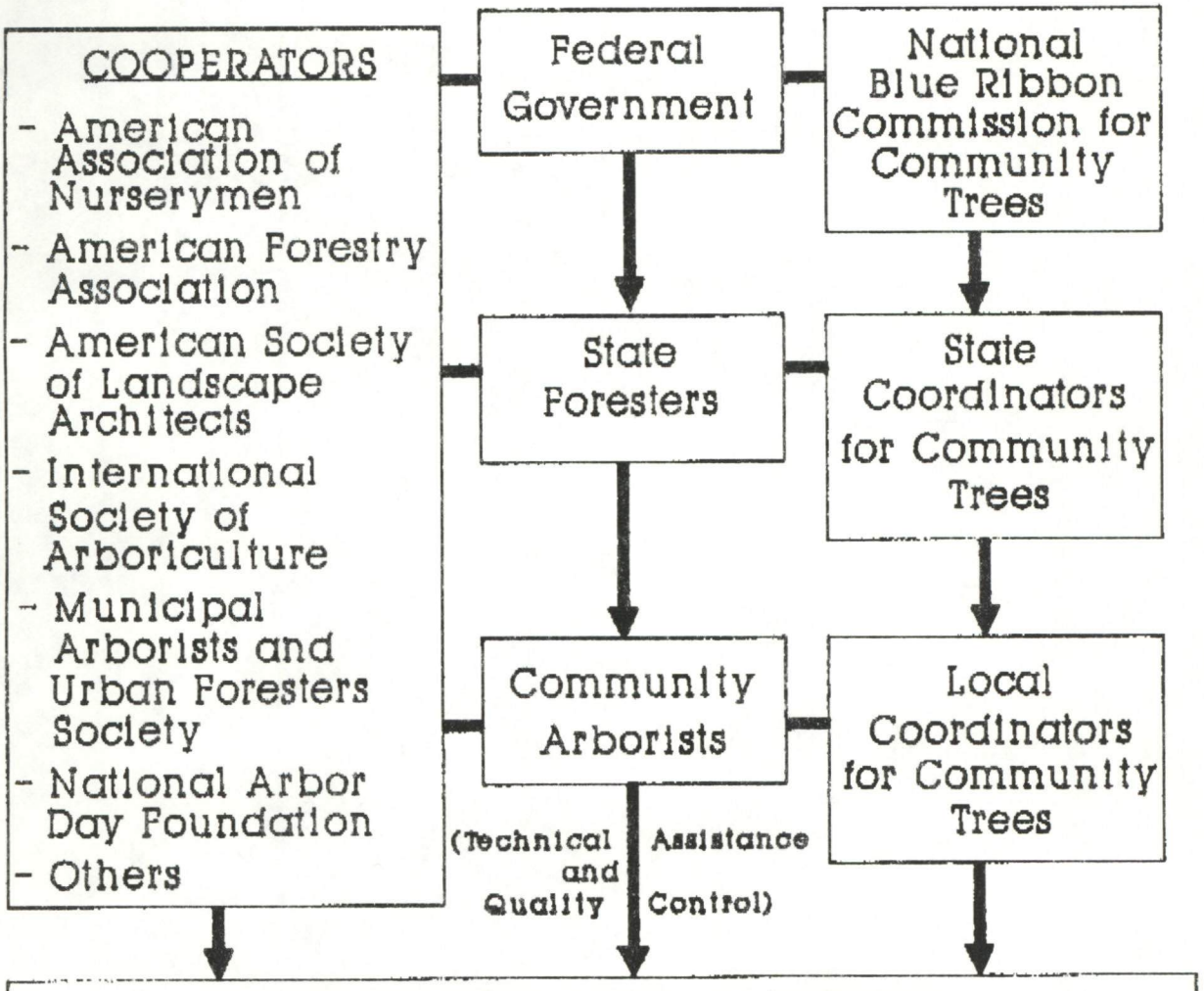
Implementation would build upon the existing USDA Forest Service urban and community forestry cooperative network. (See Chart)

The community tree network would consist of a public-private partnership at the national, regional, and local level to mobilize the public, commercial, and private sectors to provide leadership, underwrite costs, and organize volunteers at the grass roots level to plant community trees. The public and private sectors would work in tandem to plant trees on community public lands and on private lands.

National leadership would be provided by a Presidential Blue Ribbon Commission (using the Commission for the Bicentennial of the Constitution, restoration of the Statue of Liberty, and sponsorship of the Olympic Games in Los Angeles as templates). Technical and financial support and coordination would be provided by the USDA Forest Service.

Comparable partnerships would occur at the regional, State, and local levels, supported by a cadre of professional community tree coordinators at each level to provide the technical support and coordination of the volunteer efforts.

COMMUNITY TREES NETWORK



* Existing Urban Forestry Network
- Administrative and Technical Assistance by Federal/State/Local Government Agencies
- Cooperators

* Community Trees Proposal - Network Expansion
- Permanent Community Trees Commission and Coordinators
- Volunteers

Private Sector Role in Community Trees Proposal

National Level

-Blue Ribbon Commission

- o provide leadership in national awareness and informational campaign;
- o raise funds to underwrite community costs for massive tree planting and maintenance;
- o mobilize the Nation's civic and business leaders into action at the national, State and local levels.

-Cooperators

- o provide information, education, and technical assistance (e.g., American Forestry Association's Global ReLeaf campaign) about community trees;
- o coordinate the availability of suitable tree planting stock among private sector nurseries;
- o increase awareness of need for improved municipal, residential, and commercial design and construction to provide spaces for trees;
- o provide guidance and assistance to arborists.

State Level

- o provide parallel efforts to the national level. (State Governors could establish Blue Ribbon Commissions)

Local Volunteers

- o participate in fund-raising efforts, awareness and promotional activities, training, and tree planting and maintenance;
- o individual citizens and businesses would plant trees on their own property and contribute to local community efforts.

Public Sector Role in Community Trees Proposal

National Level

- o provide national leadership and oversight;
- o provide technical and financial support to the National Blue Ribbon Commission;
- o develop national awareness/informational/promotional campaign and related materials (e.g., posters, brochures, media information, etc.);
- o work with national cooperators and partners to coordinate implementation efforts.

State Level

- o provide technical information and expertise, training and financial assistance;
- o coordinate Statewide implementation efforts;
- o develop State partnerships with organizations, civic and business leaders;
- o coordinate awareness/promotional campaign to mobilize volunteer participation.

Local Level

- o coordinate with private sector nurseries to ensure availability of suitable tree planting stock;
- o provide technical expertise, labor, equipment for tree planting in the public sector;
- o coordinate efforts of community volunteers and provide training and technical assistance in tree selection, site selection and preparation, and tree planting and maintenance.

Federal Costs: an average of $20-50 million annually through 2010.

Funding would provide technical and financial assistance for:

- o urban forestry professional and technician staff and program coordinators at the Federal, State and local levels. . . . . .$8-20 million
- o communications/fund raising/volunteer coordination/promotion/ informational materials. . . . . .$8-20 million
- o demonstration projects. . . . . $2-5 million
- o training of the Community Trees workforce (volunteers, laborers, technicians, etc.). . . . . $2-5 million

Results

- o A doubling of the number of publicly-owned street trees, presently estimated at 60 million (estimated to be half the current capacity).
- o A reversal of the present trend of planting only one tree for every four that die or are removed.
- o Planting over the 20-year period approximately 4 community trees for each man, woman, and child presently living in America's cities and towns.
- o Offsetting by the year 2010 an additional 5.2 million tons of carbon dioxide emissions annually. By contrast, if the current rate of "deforestation" in America's communities were to continue, carbon dioxide emissions would increase by 9 million tons annually by the year 2010.
- o A renewal of public support and commitment to improving the environmental, economic, and social well-being of the nearly 40,000 cities, towns, and communities in the United States.

Authority:

Public Law 95-313, the Cooperative Forestry Assistance Act of 1978

RURAL TREE PLANTING AND FORESTLAND IMPROVEMENT

Proposal Includes several options of increased tree planting and forestland improvement in rural areas. Requirements for agricultural land and non-Federal forestland are summarized below:

	OPTIONS			
	2. Current Level	3. Five Percent CO_2 Offset	4. Ten Percent CO_2 Offset	5. Increased Cost-Sharing and Technical Assistance
Agricultural Land Tree Planting	600,000 acres per year	1 million acres per year	1.85 million acres per year	150,000 acres per year
Non-Federal Forestland Planting & Improvement	none	536,000 acres per year	1.3 million acres per year	150,000 acres per year
Public Forestland Planting & Improvement	TBD*	TBD*	TBD*	TBD*

*To be determined.

IMPLEMENTATION STRATEGY

Agricultural Land Delivery System The delivery system for tree planting on agricultural lands would be the Conservation Reserve Program, or a similar program. Overall administration of payments and program administration is handled by the Agricultural Stabilization and Conservation Service. Land eligibility is determined by the Soil Conservation Service. Technical responsibility for tree planting is assigned to the Forest Service, and on-the-ground technical services to landowners are provided through State Foresters. Responsibilities for tree planting include: practice installation, inspection, and certification; and, the development and implementation of site specific tree planting plans.

Non-Federal Forestland Delivery System The delivery system for non-Federal forestland tree planting and improvement would be an extension of the delivery system already in place to implement the Forestry Incentive Program (FIP) and forestry practices under the Agricultural Conservation Program (ACP). As with the Agricultural Land Delivery System, technical responsibility for tree planting is assigned to the Forest Service with on-the-ground technical assistance to landowners provided by State forestry personnel. Technical services to landowners are essentially those stated above except the non-Federal Forestland Delivery System would also include site specific silvicultural prescriptions for forest improvement cuttings.

Public Forestland Planting and Improvement Additional opportunities for tree planting and forest improvement exist on Federal and non-Federal public lands. Where they exist, planting and improvement activities will be accomplished under existing authorities. Lands in this category include those, for example, which are managed by the Department of Defense, agencies of the Department of the Interior, and the Forest Service.

Federal Costs:

Federal cost data are derived from the latest information on tree planting and forestland improvement where practices are cost-shared. For rural tree planting and forestland improvement options, Federal costs would be as follows:

	OPTIONS			
	2. Current Level	3. Five Percent CO_2 Offset	4. Ten Percent CO_2 Offset	5. Increased Cost-Sharing and Technical Assistance
Total Cost (20 years)	$2.6 billion	$5.3 billion	$12.9 billion	$1.2 billion
First Year Cost	$26 million	$50 million	$100 million	$58 million
Fifth Year Cost	$58 million	$110 million	$210 million	$58 million

The costs for public forestland planting and improvement will be determined once the analyses presently underway have been completed.

Results

The accomplishments from increased rural tree planting and forestland improvement over the 20-year period are summarized below:

	OPTIONS			
	2. Current Level	3. Five Percent CO_2 Offset	4. Ten Percent CO_2 Offset	5. Increased Cost-Sharing and Technical Assistance
Agricultural Land Tree Planting	12 million acres	20 million acres	37 million acres	3 million acres
Non-Federal Forestland Planting & Improvement	None	10.7 million acres	26.8 million acres	3 million acres
Public Forestland Planting & Improvement	TBD*	TBD*	TBD*	TBD*

*To be determined.

The results for public forestland planting and improvement will be determined once the analyses presently underway have been completed.

TREE INITIATIVE - OPTIONS SUMMARY TABLE

ITEM	OPTION 1. Community Trees Volunteer Program	2. Continue Current Level (CRP) Planting	3. Five Percent CO2 Reduction	4. Ten Perce Reductio
o Trees Planted Annually	30 million trees	409 million trees	900 million trees	1,800 mill
o Agricultural Land Tree Planting in 20 Years	None	12 million acres (0.6 million acres/yr.)	20 million acres (1 million acres/yr.)	37 mill (1.85 million
o Non-Federal Forestland Planting and Improvement in 20 Years	None	None	10.7 million acres (536,000 acres/yr.)	26.8 mill (1.3 million
o Federal Costs:				
Total Cost (20 years)	$1 billion	$2.6 billion	$5.3 billion	$12.9 bi
First Year Cost	$50 million	$26 million	$50 million	$100 mi
Fifth Year Cost	$50 million	$58 million	$110 million	$210 mi
o KEY EFFECTS				
Agricultural Land Availability	No impact	Minimal impact	Minimal impact	Some negative pasturel
Food Supply	No impact	Minimal impact	Minimal impact	Some impact and beef pro
Rural Development	Enhances social, economic, environmental well-being of small towns and communities.	Provides increased timber base; strengthens rural economy (jobs in timber and related support businesses).	Provides increased timber base; strengthens rural economy (jobs in timber and related support businesses).	Shift in short agricultural timber-based Long-term gai diversified base.
o PROS AND CONS				
Pros	o Massive volunteerism. o Modest Federal outlays. o Highly visible to public--urban and suburban people. o Could provide jobs for urban youth.	o Additional tree planting keeps prices stable and avoids negative impact on forest industry. o Maintains existing USDA/State delivery system for tree planting developed under CRP--no build-up in delivery system is necessary.	o Holds consumer lumber prices down and still gives tree growers substantial earnings. o Demonstrates U.S. commitment to offsetting CO2 emissions.	o Stumpage pri diminished. o Substantiall CO2 emissio o Establishes leadership in tree pla offset CO2
Cons	o Much of cost shifted to other levels of government and private sector. o No direct control of accomplishments.	o May adversely affect agricultural input industries.	o Some local negative effects on agricultural input industries. o Requires additional USDA program delivery resources.	o Requires sul cost increa USDA delive o Subetantial Federal cos mainly to l incentives.

ent CO2 on	5. Increased Cost-Shari & Technical Assistan
lion trees	99 million trees
lion acres acres/yr.)	3 million acres (0.15 million acres/yr
lion acres acres/yr.)	3 million acres (0.15 million acres/yr
illion illion illion	$1.2 billion $58 million $58 million
e impact-- land	Minimal Impact
on crops oduction.	Minimal Impact
t-term from economy to economy. in in economic	Minimal Impact
ices are lly offsets ons. s U.S. in position anting to emissions.	o Uses existing programs o Cost effective.
abstantial ases for ary system. l annual at keyed landowner	o Not Presidential in scope. o Small size does little for CO2 offset. o 100% cost share would undercut State incentives programs.

1) Input a state of art, results

2) Econ/ect. folks to teach ~~cost/ten here?~~ of long costs

3) Econ/sci. to reduce question

COUNCIL OF ECONOMIC ADVISERS
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON

MEMBER OF THE COUNCIL

December 19, 1989

MEMORANDUM FOR RICHARD B. STEWART
ASSISTANT ATTORNEY GENERAL
LAND AND NATURAL RESOURCES DIVISION
DEPARTMENT OF JUSTICE

FROM: RICHARD SCHMALENSEE

SUBJECT: Justice Draft of Framework Convention

I agree with the overall DOJ approach, subject to the changes outlined below.

The Administration's position that the economics of action and inaction must both be considered in policy formation should be reflected in our comments to RSWG. The USG should request that the following bullet should be added to Section 1 (preamble) of the IPCC RSWG Legal Measures Paper:

> Commitment to consider the possible adverse socio-economic impacts of policies that might be taken to address climate change.

The draft Concept Paper is very strong and clear. It might be worth flagging that the choice of an appropriate discount rate is a key issue in the design of a Global Warming Index, since the atmospheric lifetime of greenhouse gases varies widely. A markup with suggested language is attached (Attachment A).

Finally, although we will not be placing any framework language on the table in the immediate future, it is important that any draft framework documents produced for internal use reflect the need to consider both costs and benefits in setting greenhouse policy targets. Yet, the DOJ draft repeatedly notes the need to address "adverse socio-economic impacts stemming from climate change" without parallel mention of the need to consider the adverse socio-economic impacts that might stem from any policy. A marked up copy of the first six pages of the DOJ draft with suggested changes to reflect the cost side of the policy equation is also attached (Attachment B).

Attachments

DRAFT

U.S. CONCEPT PAPER
COMPREHENSIVE GREENHOUSE GAS APPROACH TO A FRAMEWORK CONVENTION ON CLIMATE CHANGE

Proposal:

The RSWG should seriously: 1) consider the merits of combining a framework convention on climate change with one or more protocols that would treat greenhouse gases collectively on the basis of a warming potential index, and 2) evaluate alternative implementation procedures including international tradeable emission reduction credits.

Summary:

Global emissions of greenhouse gases (CO_2, CH_4, N_2O, CFCs, CO, and other trace gases) are currently increasing in every country because of man's activities. Addressing the problem requires a comprehensive and flexible approach that will enable countries to find economically efficient measures to stabilize or reduce emissions while achieving economic growth. The U.S. government believes that a framework convention on climate change should establish a process focusing on the collective warming potential of greenhouse gases rather than on individual greenhouse gases. Countries should be free to select between emission reduction or sink enhancement strategies and among gases as long as these are consistent with a negotiated "collective" greenhouse gas target. Trading emission reduction credits between countries could be an option in implementing this approach. Under this approach, the Convention would set forth a general goal of stabilizing or reducing greenhouse gas emissions at levels and dates to be established in a protocol or protocols to the convention to be developed as soon as possible.

Concepts and Definitions:

Greenhouse gases differ in both their ability to trap heat and their atmospheric lifetimes. For example, methane traps heat approximately 30-40 times more effectively than CO_2, but has a lifetime of 8-12 years, while CO_2 has an effective lifetime of several hundred years. The concept of a Global Warming Potential index has been proposed as a means of accounting for these differences. Recent papers by B. Assarsson and by Lashof and Ahuja propose two similar approaches for defining such an index. For example, the second paper suggests that the Global Warming Potential of methane relative to CO_2 is 3.7. In economic terms this suggests that one could spend up to 3.7 times for reducing methane emissions relative to CO_2 emissions.

The concept of having the government set broad national emission standards, but having flexibility to achieve the goals has been used in the U.S. For example, the trading of emission

reduction credits has been used as a means of achieving real emission reductions of lead in an economically efficient manner. Further, under the proposed Clean Air Act Amendments, a national SO_2 emission target has been identified and each utility company has the choice of achieving SO_2 reductions by either directly reducing emissions at its own facilities or by purchasing allowances from another company, whichever is more economical. The application of such a concept, while never attempted on a cross-pollutant or global scale, would enable each country to achieve emission targets using a least cost approach.

Advantages of the Proposed Approach:

The proposed approach has the following benefits:

- It would encourage economically efficient approaches within countries and possibly among countries. This is especially important for developing countries that are constrained economically.

- By addressing greenhouse gases collectively, it would reduce the number of separate protocols, thereby accelerating comprehensive international action.

- It may serve to facilitate the process of developing a convention even though uncertainties remain over the economic impacts of a protocol. Trading could act as a safety valve, if it turned out that reductions within a country were more expensive than anticipated.

- It provides flexibility to each country to manage emissions in a manner consistent with its own social and political needs. It allows tradeoffs between sources and sinks, to the extent feasible.

- It provides incentives to develop and use cost-effective, energy-efficient industrial and consumer products, emission control technologies, reforestation and agricultural practices.

- It may especially benefit developing countries where low cost emission reductions may be possible and where there is the greatest need for economic support.

Issues to be Addressed:

In developing a convention/protocol(s) along the lines suggested, the following factors would need to be considered:

- Defining an appropriate Global Warming Potential index. Initial consideration should be given to including at a minimum CO_2, CH_4, and CO. Also, the approach should allow

and the choice of an appropriate discount rate to be used in aggregating the greenhouse potential of gases with varying atmospheric lifetimes [3]

DRAFT

other gases to be added at a later date as new scientific information is developed. The issues of whether CFCs should be included must be addressed.

- Establishing global and equitable national targets in terms of the index. This will require estimating each country's emissions by major gas for a baseline year. It will also require careful consideration of when the treaty should enter into force and the need for interim objectives. Each country would be free to allocate current and future emissions in any manner.

- Evaluating whether and how credits should be given to national governments for actions taken prior to when the convention enters into force, e.g., nuclear power, reforestation, CFC reductions and others.

- Evaluating alternative administrative, implementation, and enforcement mechanisms, including possibly a system of international emissions trading. International emissions trading could leave the primary burden for arranging trades to the private sector, but national governments will have to provide guidance, monitoring and enforcement. In addition, an international tracking system will be needed to record data and assess trends as a complement to current UN efforts to compile fuel use and other data.

- Assessing the special needs of developing countries including their specific technological needs, financial requirements and the most appropriate manner for them to participate in such a convention.

- Evaluating the interrelationship of other complementary global initiatives such as the call to reforest 12 million hectares of forest land per year.

- Evaluating how to determine credits for sinks, such as reforestation and agricultural practices.

ATTACHMENT B

1

Convention on Global Climate Change

The Parties to this Convention,

Recognizing that anthropogenically-induced increased concentrations of the so-called "greenhouse gases" in the atmosphere may lead to global warming and other changes in the global climate,

Recognizing further that such changes in the global climate could result in significant adverse environmental and socio-economic impacts,

Recognizing that such potential adverse impacts are a common concern of mankind,

Recognizing the interrelationship among all the greenhouse gases, their sources and sinks, and the consequent utility of addressing them collectively,

Recalling the pertinent provisions of the Declaration of the United Nations Conference on the Human Environment, and in particular Principle 21, which provides that "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction",

Recognizing the right of mankind to live in a viable global environment and the desirability of avoiding adverse impacts on that environment ~~resulting~~ that could result from anthropogenically-induced global climate change, for the benefit of present and future generations,

Recalling the work of the Intergovernmental Panel on Climate Change (IPCC), which was jointly established by the World Meteorological Organization and the United Nations Environment Programme,

Recalling further UN General Assembly Resolution 43/53 of 6 December 1988 on global climate change,

Taking into account the circumstances and particular requirements of the developing countries,

Recalling the 1985 Vienna Convention for the Protection of the Ozone Layer and its 1987 Montreal Protocol on Substances that Deplete the Ozone Layer,

Recognizing also that continued economic growth serves the vital interests of present and future generations,

Supportive of the vital contributions made by the World Meteorological Organization, the United Nations Environment Programme, the United Nations Economic, Scientific, and Cultural Organization, the Intergovernmental Oceanographic Commission, and other organizations involved in the study of climate change,

Conscious of the need to support and ensure coordination with the international studies of global processes being conducted with the International Geosphere Biosphere Program of the International Council of Scientific Unions,

Aware of the need for further research and systematic monitoring to develop scientific knowledge about the global climate and possible adverse environmental impacts resulting from its modification,

Aware also of the need for further study of the social and economic impacts of global climate change,

Mindful of precautionary measures that have already been taken at the national, regional, and international levels,

Noting the need to develop further strategies to limit and adapt to potential global climate change,

Aware that measures to limit or adapt to potential global climate change will be more effective if based on international cooperation and action,

Aware further that such measures should be based on relevant scientific and technical considerations, and should be as equitable and economically efficient and effective as possible,

HAVE AGREED AS FOLLOWS:

and of measures that might be used to address it,

Article 1
Definitions

For purposes of this Convention:

1. 'Parties' means, unless the text otherwise indicates, Parties to this Convention.

2. 'Protocols' means protocols to this Convention.

3. 'Global climate' means...

4. 'Adverse impacts' means...

5. 'Greenhouse gases' means...

6. 'Net emissions' means...

7. 'Global warming potential index' means...

8. 'Sources' means...

9. 'Sinks' means...

10. 'Regional economic integration organization' means an organization constituted by sovereign States of a given region which has competence in respect of matters governed by this Convention or its protocols and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.

Article 2
General obligations

1. The objective of this Convention is to provide the scientific, environmental, technical, and economic bases for developing and implementing, as appropriate, realistic and effective strategies aimed at addressing the potential modification of the global climate caused by man-induced emissions of greenhouse gases and the potential adverse environmental and socio-economic impacts that could result therefrom.

2. To this end, the Parties shall, in accordance with the means at their disposal and their capabilities:

(a) cooperate by means of systematic monitoring, research, and information exchange in order to better understand and assess the effects of human activities on the global climate and the potential adverse environmental ~~and socio-economic~~ impacts resulting from modification of the global climate;

NOTE emissions have no socio-economic impact in and of themselves

(b) cooperate, individually, jointly, and/or through competent international bodies, in promoting public awareness of the potential adverse environmental ~~and socio-economic~~ impacts of emissions of greenhouse gases;

(c) consider, on the basis of scientific, environmental, technical, and economic assessments, possible measures to limit or adapt to potential global climate change;

(d) cooperate in the formulation of agreed measures to limit or adapt to potential global climate change;

(e) endeavor to take steps that would have the effect of limiting potential global climate change that are already justified on other grounds;

(f) encourage the development and transfer of relevant technologies, as well as the provision of technical assistance;

(c') Consider the likely effect of these measures on prospects for economic growth

(g) develop national net emissions inventories and strategies for addressing potential global climate change; and

(h) cooperate with competent international bodies to implement effectively the objectives of this Convention.

Article 3
Research and Systematic Monitoring

1. The Parties undertake, as appropriate, to cooperate in, directly and/or through competent international bodies, the conduct of research into and/or development of:

(a) the physical and chemical processes that may affect the global climate;

(b) activities, substances, practices, and processes that could modify the global climate;

(c) instrumentation and other techniques for monitoring and measuring emission rates of greenhouse gases;

(d) improved models for a better understanding of the effects of greenhouse gas emissions on the global climate;

(e) the environmental and socio-economic impacts that could result from modification in the global climate;

(f) alternative substances and technologies;

(g) the ~~economic aspects~~ socio-economic impact of various means of addressing the potential modification of the global climate;

and as further elaborated in Annex I.

2. The Parties undertake to promote or establish, as appropriate, directly and/or through competent international bodies and taking fully into account national legislation and relevant ongoing activities at the national, regional, and international levels, joint or complementary programmes for systematic monitoring of the global climate, as elaborated in Annex I.

3. The Parties undertake to cooperate, directly and/or through competent international bodies, in ensuring the collection, validation and transmission of research and observational data through appropriate world data centers in a regular and timely fashion.

Article 4
Exchange of Information

1. The Parties shall facilitate and encourage the exchange of scientific, technical, socio-economic, economic, commercial and legal information relevant to this Convention, as further elaborated in Annex II. Such information shall be supplied to bodies agreed upon by the Parties. Any such body receiving information regarded as confidential by the supplying Party shall ensure that such information is not disclosed and shall aggregate it to protect its confidentiality before it is made available to all Parties.

2. In addition, the Parties shall, through a body agreed upon by the Parties, exchange information on the national emissions inventories and strategies referred to in Article 6.

Article 5
Public Awareness

The Parties, individually, jointly or through competent international bodies, shall cooperate in promoting public awareness and common understanding of the causes and potential adverse impacts of global climate change, as well as practices that would have the effect of limiting or adapting to global climate change.

Article 6
National Net Emissions Inventories and Strategies

The Parties shall, by _____, develop inventories of sources and sinks of all greenhouse gases and strategies for _____....

Article 7
Response Measures

1. The Parties, acting through the Conference of the Parties established under Article 9, shall develop, as soon as possible, a protocol containing specific response measures. The protocol shall treat all adequately scientifically understood greenhouse gases, their sources and sinks, comprehensively to control net emissions of greenhouse gases through national performance targets. The protocol shall employ the concepts of 'net emissions' and a 'global warming potential index'. The Parties shall develop equitable and economically efficient and effective implementation mechanisms, including a system of international emissions trading.

2. The Parties, in developing the protocol called for in paragraph 1, shall, inter alia,

(a) define an appropriate global warming potential index;

(b) establish global and national greenhouse gas net emissions targets in terms of both the global warming potential index and factors such as population and GDP;

(c) evaluate alternative administrative and enforcement mechanisms;

(d) assess the special needs of developing countries, including their specific technological and financial needs and the most appropriate manner in which they should participate in the protocol; and

(e) evaluate the relationship between the protocol and other complementary global initiatives related to climate change such as reforestation targets.

3. The protocol called for under paragraph 1 shall be based, inter alia, on the Parties' assessment of the available scientific, environmental, technical, and economic information with respect to:

a) the potential effect of anthropogenically-induced greenhouse gas emissions on the global climate;

b) the potential environmental and socio-economic impacts of global climate change.

4. The Parties agree that agreed measures with respect to the production and consumption of ozone-depleting substances will be implemented within the framework of the 1985 Vienna Convention on the Protection of the Ozone Layer and the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer.

5. The provisions of this Convention shall not affect either the right of a Party to adopt, in accordance with international law, domestic measures relevant to modification of the global climate or domestic measures already taken by a Party, provided that these measures are not incompatible with its obligations under this Convention.

Article 8

Technology Development and Transfer

[elaborate Article 2(2)(f)]

c) the potential socio-economic impacts of targets that might be adopted

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COUNCIL OF ECONOMIC ADVISERS
EXECUTIVE OFFICE OF THE PRESIDENT
WASHINGTON

MEMBER OF THE COUNCIL

DS
cmy

December 7, 1989

MEMORANDUM FOR KEN YALE

FROM: DICK SCHMALENSEE

SUBJECT: Today's Reforestation Paper

While this version is better in many respect from the last one, I still have problems:

- In the first line of the last paragraph on page 1, "of" should be "to". The second sentence would be clearer as, "Plausible unilateral U.S. actions to reduce CO2 emissions, including the reforestation options presented here, will have negligible effects on the global environment." The third line from the bottom in this paragraph should become "emissions to 80 percent of 1987 levels by 1995 and to 50 percent by 2002..."

- I can't figure out what purpose is served by the second paragraph under Current Reforestation Activities. The first paragraph implies that we now carry about 1,000 trees per acre, while the second suggests a steady-state value of 100. I can't offhand see how this detail will help DPC principals understand what's going on here; I, at least, was only confused by it.

- The second sentence in the second complete paragraph on page 4 is somewhat misleading. The act of planting may be less expensive on agricultural land, but the net cost of reforesting such land may be higher because its value in other uses (the rental rate that is its opportunity cost) is higher.

- Unless and until somebody shows me that somebody at CEA has participated in a meaningful way in the analytical work underlying this document or gives us a chance to review that work in detail, I strongly object to CEA's being listed at the bottom of page 4. We have not reviewed and do not in any way endorse the estimates presented here. (See the next two points.) I wonder if DOT was any more involved than we were.

- I remain very skeptical of the CO2 reductions claimed for these options. I have only been able to obtain the Forest Service analysis underlying the estimates for the (now-excluded) community trees/volunteer program, and that

analysis is badly flawed. If the other work is as bad as what I have seen, the CO2 reduction estimates presented here are extremely unreliable. They should be closely reviewed by somebody outside the Forest Service, and, if controversy remains, ranges should be presented instead of point estimates -- as was done for Clean Air.

- To repeat a point I made in my earlier memo, large subsidized tree planting programs like Options 1-3 will tend to depress future timber prices. This, in turn, will tend to reduce planting by forestry firms. Absent some sort of comprehensive regulatory program to control planting and removal everywhere, there is absolutely no reason to suspect that the net effects of these options will be even close to the effects presented here. Given what I have seen, I would be stunned if the Forest Service analysis takes these important depressing effects on non-subsidized planting into account. I also note that this point appeared as a con under only one option in the earlier edition; now it appears nowhere even though it now applies to all options.

- Since the environmental effects of <u>all</u> these options are trivial, I fail to see why the volunteer program was dropped as a separate option because "it would be too small a program by itself to have substantial effect on CO2 reduction." (Note that an "a" is missing from this sentence.) Surely the DPC should <u>decide</u> whether we need an expensive, large reforestation program that has a substantial effect on US emissions but no effect on global change.

DOMESTIC POLICY COUNCIL
Working Group on Global Change
Task Force on Economic Costs

Attendees from Monday, November 27, 1989 Meeting

NAME	AGENCY	PHONE/FAX
Bruce Bartlett	Dept of Treasury	566-2768/786-8452
Barbara Claffey	CEA	395-3114/395-6947
Keith Collins	USDA	447-5955/475-4915
Robert Corell	NSF and CES	357-9715/357-9629
Alexander Cristofaro	EPA	382-5490/252-0275
Alan Dunn	Dept of Commerce	377-0614/377-8836
Howard Gruenspecht	CEA	395-6982/395-6947
Michael Hall	Dept of Commerce	443-8415/443-5167
Jeffrey Holmstead	WH/Ofc of Counsel	456-7803/456-7929
John Houghton	OSTP	395-3902/395-3719
Mark Kerrigan	Dept of Energy	586-4159/586-5313
Leo Mayer	USDA	447-6185/475-4915
Nancy Maynard	OSTP	395-3902/395-3719
Barry McBee	White House/OCA	456-6437/456-2223
William Nitze	Dept of State	647-2232/647-0774
Daniel Reifsnyder	Dept of State	647-4069/647-5947
Paul Roellig	White House/OPD	456-7988/456-7739
Daniel Rosenthal	Dept of Interior	343-2563/343-4867
Morton Schnabel	Dept of Commerce	377-3753/377-0432
John Schrote	Dept of Interior	343-4123/343-3561

William Sprigg	Dept of Commerce	443-8646/377-0432
Michael Springer	Dept of Treasury	343-0275/786-8452
Raymond Squitieri	Dept of Treasury	566-6918/786-8452
Robert Watson	NASA	453-1681/755-2552
Edward Williams	DOE	586-2061/586-5313