

THE CONSEQUENCES OF A
HYPOTHETICAL WORLD CLIMATE CHANGE
PRODUCED BY INCREASED
ATMOSPHERIC CARBON DIOXIDE

MASTER

Progress Report
for period 1 September, 1979 to 31 April, 1980

Walter Orr Roberts

Aspen Institute for Humanistic Studies
Program in Food, Climate and
the World's Future
Boulder, Colorado

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May 1980

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Prepared for
THE U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
UNDER CONTRACT NO. DE-AC02-79EV10281

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ABSTRACT

Many research groups are at work on the important long-term task of understanding the effects of atmospheric carbon dioxide (CO₂) on world climate. Most experts expect that the CO₂ increase will continue, and that therefore a global climate warming will occur within 25 to 50 years, with attendant strong regional climate alterations. Our one-year preparatory study on "The Consequences of a Hypothetical World Climate Change Produced by Increased Atmospheric Carbon Dioxide" has three closely related objectives in looking at this issue.

First, we are attempting to outline the major social, economic, geopolitical and ethical issues to be faced should a global warming occur as a result of increased atmospheric carbon dioxide. A report which attempts to answer these questions will be completed by the end of the contract period. Two major revisions have been done on the report to date.

Secondly, our goal is to lay the groundwork and make recommendations for a longer-term effort to delineate possible strategies to meet the social, political and economic challenges posed by our knowledge of the growing atmospheric burden of CO₂. Plans for the follow-on will be discussed at an international conference in West Berlin, May 18-23, sponsored by the Aspen Institute Berlin. Recommendations will be given to DOE in a letter report at the conclusion of the project.

A third part of our effort is to disseminate our findings widely and attract international and national support, both financial and moral, for a follow-on study. We have already begun this effort and will continue for the duration of the project and beyond.

ACTIVITIES TO DATE - SEPTEMBER 1, 1979 to APRIL 30, 1980

Steering Committee Selection

The first major task of the project was to identify and select a highly qualified and multi-disciplinary Steering Committee. We were fortunate to enlist the services of a group of persons with a diversity of backgrounds and expertise. The committee is comprised of social scientists, political scientists, economists, physical scientists and policy makers. (List Attached-Attachment 1)

Draft Report

A second major task in the early months of the project was the preparation of a first draft of a report which outlines the major aspects of the carbon dioxide climate impact issue. This draft was prepared by Dr. William W. Kellogg, Principal Investigator,

and Dr. Robert Schware, a full-time consultant to the project. (A copy of this early draft report was previously submitted to the DOE in Washington.) The authors discussed the draft report in detail with nearly every member of the Steering Committee during the period of late November to early December. In the light of these discussions and other comments the report has been extensively revised. The significant results of our study will be presented in the final version of the report at the completion of the project. A copy of the most recent draft has been sent to Dr. David Slade, Manager of the DOE Carbon Dioxide and Climate Research Program.

Brookings Institution Subcontract

We have in addition entered into a subcontract agreement with the Brookings Institution (13 February 1980) to have Dr. Lester Lave prepare a paper on mitigating strategies should the untoward effects of increased atmospheric concentrations of carbon dioxide become manifest. In his study Dr. Lave will be looking at a general approach to quantifying the nature of the economic adjustments to carbon dioxide-induced climate change and identifying areas of institutional and social strain. His study will attempt to answer such questions as: What actions could be taken by various governments to facilitate adjustment? What private sector actions would tend to be destabilizing, e.g., land speculation? Which institutions are likely to come under the most strain and what could be done to help them facilitate adjustment?

Meeting at Aspen's Wye Plantation 24-29 February, 1980

In December 1979, at the request of DOE, the project temporarily moved in a somewhat different direction. We devoted our attention to the drafting of a long-range program of research devoted to the "Assessment of Economic, Social, and Political Impacts of Carbon Dioxide-Induced Climatic Change." A document outlining such a research program was prepared "for discussion purposes only." It was the major input to a week-long workshop held at Aspen Institute's Wye Plantation, Maryland, 24-29 February. The major subject headings for the program under discussion were:

- Economic assessment of climatic impacts;
- Evaluation of societal impacts and strategies;
- Information, perception, and the political decision-making process.

Each of these was broken down into sub-tasks, and some sense of the relative priorities to be attached to each emerged. Participants included project staff and members of the Project Steering Committee, whose costs were covered under the contract. Additional participants

invited at the suggestion of the DOE-Washington were supported with other DOE funds.

The program description, which was discussed at the meeting, is in the process of being rewritten. It will be submitted to DOE and the National Climate Program Office in early May.

The meeting at Wye Plantation also provided additional useful material for the second draft of the main project report already referred to.

Presentation of Papers

During the course of the project a number of papers have been prepared for presentation at national and international meetings by members of the Aspen Institute staff, each one covering some aspect of the study. Some will appear in the conference proceedings. Since this study is highly interdisciplinary it has been important for staff members to attend a variety of meetings where diverse points of view could be explored and significant inputs to the study made. These meetings have also made possible the dissemination of information about our project to others who are studying the issues. A list and copies of the papers (in chronological order) are attached. (Attachment 2)

FUTURE PLANS FOR REMAINDER OF THE CONTRACT

Berlin Workshop

With the purpose of obtaining European and developing country inputs to the study, Walter Orr Roberts, Project Director, has convened a one-week Workshop, to be held at Aspen's West Berlin Conference Center 18-23 May. Our efforts to fulfill the three major goals of the project will be assisted in a major way by this workshop. Expenses for the Workshop are being met by Aspen Institute Berlin and private foundation grants. The meeting has also been co-sponsored by the World Meteorological Organization but this organization has not provided any funding for the workshop. Permission has been requested from DOE to support transportation to the workshop for project staff members, Roberts, Kellogg and Schwere. Their local costs will be covered by Aspen Institute Berlin.

A second draft of the Kellogg-Schwere report will serve as the basis for the Workshop discussions. At the Berlin Workshop the participants will also discuss the following:

- Mechanisms and institutions for world decision making regarding a global environmental problem that involves long-lead times for decision, substantial scientific uncertainties, conflicting regional benefits/disbenefits, and concerted

action by nations at diverse levels of development and with different systems of governance. The workshop will also examine available means for sustaining intelligent public awareness of a problem of long duration and low rate of change, but one with large ultimate risks.

-Incentives and disincentives for countries to curtail CO₂ production. Short of ecological and/or socio-economic disasters, what will serve as a sufficient catalyst for national and international action on the CO₂ problem?

-Identification of the national and international initiatives that can be taken within the next 10 years to maximize cooperation in anticipating and mitigating CO₂-induced climatic impacts. These are likely to be primarily in the areas of food, energy, and land use.

-Recommended priorities for the International climate Impact Studies Program (World Meteorological Organization and United Nations Environment Programme) and for national research programs on climatic impacts.

Conference on "International Law, Institutions and World Climate Change"

Central to our study of the political, socio-economic, and ethical consequences of a hypothetical atmospheric warming is the identification and assessment of mechanisms of international law which may, within the coming few decades, become especially applicable to CO₂-related issues. Are there international mechanisms to deal with this essentially global problem? Can responsibility for damage induced by CO₂ production and the consequent climatic change be assessed internationally? If so, what types of decision-making responses will be likely? These and other questions will be the focus of a forthcoming conference sponsored by the Aspen Institute and the University of Denver, College of Law, International Legal Studies Program, to be held in Denver, Colorado, July 10 and 11, 1980.

Final Report Revision

With the input from the discussion at the Berlin and Denver workshops, the project report will undergo a last revision. The final report will be distributed widely. Our plan is to print approximately 2000 copies.

Recommendations for follow-on study

The recommendations we develop for the direction and management of the follow-on study will be summarized and reported to the DOE in letter form at the time the final report is completed.

Other tentative future plans

The possibility of presenting the findings of our study at a seminar sponsored by DOE in Washington in the fall of 1980 has been discussed with Dr. Slade of DOE.

Staff members may also present findings at other relevant meetings and workshops.

PROJECT PERSONNEL

Dr. William W. Kellogg, Principal Investigator, has spent one-half time on the project from September 1, 1979 and will continue to devote this percentage of his time to the project for the remainder of the contract term.

Dr. Walter Orr Roberts, Project Director, has spent 1/10 of his time on the project. Dr. Roberts' time is contributed at no charge to the Department of Energy. He will continue to contribute approximately this percentage of time to the project.

Dr. Robert Schware, Consultant, has been working full time on the project. A large portion of Dr. Schware's consulting fee is being charged to DOE; part of his fee has been paid for by a private foundation grant.

Mary L. Wolff, Program Administrator, has devoted 1/12 time to this project and will continue to do so throughout the remainder of the contract.

In addition to the above staff, two secretaries are working on the project. One secretary is working approximately 1/2 time on the project; the other 1/3 time.

-End-

Attachments: CO₂ Climate Impact Study Steering Committee members
List of papers presented by project staff (and papers-
in chronological order)

15 January 1980

CO₂ Climate Impact Study
Steering Committee

Representative George E. Brown, Jr., U.S. Congressman,
2342 Rayburn House Office Building, Washington, DC 20515

Dr. Rolando V. Garcia, Meteorologist, Universidad Autonoma, (VAM)
Xochimilo, Mexico

Dr. Stanley Greenfield, Teknekron, Inc., 2118 Milvia Street,
Berkeley, CA 94704 (415-548-4100)

Dr. Robert W. Kates, Political Scientist/Geographer, Woodrow Wilson
International Center for Scholars, Smithsonian Institution Building,
1000 Jefferson Drive S.W., Washington, DC 20036 (202-381-5613)

Dr. Lester B. Lave, Economist, Brookings Institution, Washington, DC 20036
(202-797-6000)

Professor Donella Meadows, Economic Modeler, Resource Policy Center,
Thayer School of Engineering, Dartmouth College, Hanover, NH 03755
(603-646-3551)

Dr. Mihajlo Mesarovic, Economic Modeler, Case Western Reserve University,
Cleveland, OH 44106 (216-368-2000)

Dr. V. Kerry Smith, Economist, Department of Economics, University of North
Carolina, Chapel Hill, North Carolina 27514
(919-966-2383 Econ. Dept.)

Dr. Edith Brown Weiss, Associate Professor of Law, Georgetown University
Law Center, 600 New Jersey Avenue, N.W., Washington, DC 20001
(301-229-5643)

Dr. Gilbert F. White, Geographer, Institute of Behavioral Science,
University of Colorado, Boulder, CO 80309 (303-492-8417)

Dr. Robert M. White, Meteorologist, Administrator, National Research
Council, Washington, DC 20418 (202-389-6102)

LIST OF PAPERS PRESENTED BY PROJECT STAFF (September 1, 1979 to April 30, 1980)

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| W.W. Kellogg | The prospect of a global warming and studies of its societal impacts, Proceedings 7th Global Modeling Conference, International Inst. for Applied Systems Analysis (IIASA), Laxenburg, Austria, 2-5 October 1979 (Travel and expenses paid by private foundation funds) |
| R. Schware | A global political systems perspective to climate-society interactions, presented at IIASA Task Force meeting on "The Nature of Climate and Society Research", Laxenburg, Austria, 4-6 February 1980 (Travel and expenses paid by IIASA) |
| W.O. Roberts | Costs of climate impacts, Proceedings of Workshop on Energy/Climate Interactions, Munster, F.R.G., 3-7 March 1980 (Travel paid by F.R.G. funds, expenses Aspen Institute funds) |
| W.W. Kellogg | Aerosols and climate, Proceedings of Workshop on Energy/Climate Interactions, Munster, F.R.G., 3-7 March 1980 (Travel and expenses paid by F.R.G. funds) |
| W.O. Roberts/ W.W. Kellogg | Assessment of risks, costs, and countervailing measures (Chairmen's Statement for Working Group III), Proceedings of Workshop on Energy/Climate Interactions, Munster, F.R.G., 3-7 March 1980 (Travel and expenses same as above) (Final report not available at this time) |
| W.W. Kellogg | Awareness of Mankind as a Factor in Climatic Change Proceedings NATO Advanced Study Inst. on Climatic Variations and Variability: Facts and Theories, Erice, Sicily, 9-21 March 1980 (Travel and expenses paid by NATO funds) |
| R. Schware | Toward a political analysis of the consequences of a world climate change produced by increasing atmospheric carbon dioxide, presented at Southwestern Political Science Assoc. Annual Meeting, Houston, Texas, 2-5 April 1980 (Travel and expenses paid by DOE contract funds) |
| Aspen Staff | (Presented by W.W. Kellogg) Statement to the Senate Committee on Energy and Natural Resources, Washington, D.C., 3 April 1980 (Travel and expenses paid by DOE contract funds) |
| W.W. Kellogg | Modeling the prospects for climatic change: Current state-of-the-art and implications, Proceedings DOE/Resources for the Future Conference on Economic Methodologies for Climate Change, Ft. Lauderdale, Florida, 24-25 April 1980 (Travel paid by Resources for the Future funds) |

Conf. papers Cycled Separately