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CLIMATE AND HEALTH

WORKING GROUP MEETING
18-19 MAY 1999

WORLD HEALTH ORGANIZATION

GENEVA

A circular illustration depicting a cross-section of the human environment. At the top, a sun and moon are visible. Below them is a cityscape with buildings and mountains. In the middle, there is a body of water with fish. At the bottom, several stylized human figures are shown with their arms raised, representing a community or population. The text 'Protection of the Human Environment' and 'Occupational and Environmental Health Series' is overlaid on the illustration.

Protection of the Human Environment
Occupational and Environmental Health Series

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**CLIMATE AND HEALTH
WORKING GROUP MEETING
18/19TH MAY 1999
WORLD HEALTH ORGANIZATION, GENEVA**

1. Overview of current activities related to climate and health in WHO

An informal consultation was held in Geneva to discuss current activities and identify areas of work for the work on Climate and Health, within the Occupational and Environmental Health unit. The meeting Agenda is given in Appendix A. The list of participants is given in Appendix B.

WHO is a member of the InterAgency Committee on the Climate Agenda (IACCA) set up to coordinate relevant climate related activities. In its second session held in Geneva in 1998, the establishment of an InterAgency Network on Climate and Human Health, with a secretariat coordinated by WHO was discussed.

Some activities relating to climate variability and change in WHO exist, but there has been relatively little coordination between groups:

1. WHO nominated several lead authors for the IPCC Third Assessment Report and is participating in the governmental review of the IPCC Special Report on Technology Transfer for Mitigation and Adaptation.
2. WHO has updated the UNEP fact sheet **Climate change and human health** (Appendix C).
3. WHO has a member (SDE/EHA) on the UN InterAgency Task Force on El Niño, coordinated by IDNDR.
4. WHO has commissioned a report on ENSO and health which will be published and made available on the web site. (http://www.who.int/peh/climate/climate_and_health.htm).
5. WHO/PAHO has held several workshops and written reports on the implications of El Niño for human health in the Americas in 1998/99.
6. WHO/EURO-ECEH convened a Working Group on the Early Human Health Effects of Climate Change in Europe. The working group met twice in 1998, in May and October 1998. The Working Group and ECEH produced a policy document on climate change, stratospheric ozone depletion and health for the 3rd Ministerial Conference on Environment and Health in Europe (14th-16th June in London; Appendix D). Documents are available at: (<http://www.who.dk/London99/WelcomeE.htm>). The background document is being issued as a separate publication.

7. WHO/EURO-ECEH is involved in a UNEP/ U. Delaware/ WMO Climate and Health Showcase project - the development of a Hot Weather Watch/Warning System in Rome (heatwave early warning system).
8. WHO is involved in a UNEP/ U. Delaware/ WMO /USEPA Hot Weather Watch/Warning System in Shanghai.
9. WHO/EURO-ECEH has developed a draft work-plan for climate and health in Europe for the next 3 years and is seeking funding for several projects.
10. EURO-Copenhagen is undertaking a research project to develop predictive models to forecast the impact of climate change on malaria in Central Asia, in collaboration with Dr Philippe Martin at the EU joint research centre in Ispra, Italy.
11. WHO-AFRO sub-regional office for southern Africa has been involved in a research project on the application of climate forecasts to health and disease in Africa.
12. A Summary Action on the Climate and Health Agenda has been circulated for discussion (Appendix E).
13. WHO/EURO-ECEH has developed together with eight other European major research institutions a proposal on Climate change and adaptation strategies for human health in Europe
14. WHO/EURO-ECEH is part of the task force on flood prevention and protection with Germany as lead country and has recently delivered a paper on the public health consequences of floods, prevention and control measures.
15. WHO/EURO-ECEH is involved in the extension of the APHEA project on air pollution climate and mortality, recently submitted to the 5th framework program
16. WHO/EURO-ECEH collaborates closely together with the GCOS/GTOS (Global Climate Observing System and Global Terrestrial Observing System) and contributes to the 5th session of the Terrestrial Observation Panel for Climate (TOPC).
17. WHO/EURO-ECEH has been requested to be part of the task force of the Networking of Long -term Integrated Monitoring in Terrestrial Systems (NoLIMITS), project financed by the EC and has recently contributed to develop a small common project.

2. Identification of priority areas for WHO

Several criteria are important for the selection of priority areas for WHO. In particular, they must address current climate issues rather than selectively focus on future climate change. The projects selected should:

- C be relevant for current health needs;
- C have demonstrable achievements within a short-time span;
- C be undertaken by different parts of WHO (HQ, Regional Offices, Collaborating Centres) in a coordinated way;
- C be intersectoral and collaborative projects;
- C involve formal interagency mechanisms;
- C fit current priorities of WHO, e.g. malaria, sustainable development.

The policy document by WHO-ECEH presented at the 3rd Ministerial Conference asks for the following activities to be supported in Europe:

- A. The establishment of a Europe-wide interagency network for monitoring, researching and reviewing the early human health effects of climate change and of stratospheric ozone depletion, developing and advocating prevention, mitigation and adaptation policies, and identifying specific research priorities in that field. WHO-ECEH should act as a coordinator in this network as part of the global programmes under the Inter-Agency Committee on the Climate Agenda endorsed in 1998 by the World Health Assembly and link it to other relevant global programmes such as those arising from the United Nations Framework Convention on Climate Change and the Montreal Protocol on Substances that Deplete the Ozone Layer.
- B. Interdisciplinary research into the study and forecasting of health impacts of climate change and stratospheric ozone depletion, focusing particularly on health outcomes relevant to European populations, and ensure that funding is available for this purpose. Related disease monitoring and research networks should be strengthened. Professional education and training should also be strengthened, with emphasis on acquisition of the necessary interdisciplinary understanding and research skills.
- C. Identification, development, standardization, evaluation and broad use of systems for monitoring and assessing changes in environmental indicators, bio-indicators of health risk and impacts on health as well as indicators of population health status across Europe. These systems must be coordinated with global monitoring activities.
- D. Develop capacities, as necessary, to undertake national health impact assessments with the aim of identifying the vulnerability of populations and subgroups and will ensure the necessary transfer of know-how among countries. We will make these assessments available for possible consideration in the forthcoming Third Assessment Report of the Intergovernmental Panel on Climate Change.
- E. Carry out ongoing reviews of the social, economic and technical prevention, mitigation and adaptation options available to reduce the adverse impacts of climate change and stratospheric ozone depletion on human health. We will support the implementation of prevention, mitigation and adaptation strategies taking into account national impact assessments, e.g. by strengthening surveillance activities, with appropriate public education and with special reference to vulnerable groups.

WHO-ECEH, in collaboration with the European Science Foundation, has been directly involved in developing a research agenda on climate change and health for Europe. This document will also be presented at the London conference.

Table 1 lists examples of potential activities for WHO on climate and health that were discussed during the two day meeting. Shaded areas indicate priority areas for WHO involvement. Several funding sources for the activities have already been identified.

Table 1: Potential activities for WHO on climate and health

Activity	Responsibility	Climate	Climate Change		
			<i>Future changes in extreme events</i>	<i>Future changes in mean climate</i>	<i>Mitigation</i>
		<i>Variability: extreme events, ENSO</i>			
<i>Data Collection</i>	Collaborating centres				
<i>Research</i>	Collaborating centres/WHO Regions	water- and food-borne disease projects		development of research agenda (ECEH-Rome)	hydro, air pollution impact assessment
<i>Monitoring</i>	Collaborating centres/WHO Regions			development of climate-health indicators (ECEH-Rome); implementation	
<i>Service Provision</i>	Collaborating centres/WHO Regions	early warning for heatwaves, epidemics (malaria), severe events			
<i>Information Exchange</i>	HQ/WHO Regions	web sites, fact sheets, reports			
<i>Policy advice</i>	HQ/WHO Regions	adaptation strategies	translation and interpretation of IPCC reports, adaptation strategies		advocacy Secondary health benefits of mitigation
<i>Capacity building</i>	HQ/WHO Regions		National Health Impact Assessments for small islands WHO-ECEH Guidelines on climate-health impact assessment		

3. Suggested projects

I. Guidelines for National Impact and Adaptation Assessments

Under the UN Framework Convention of Climate Changes, all signatory countries are committed to producing a national assessment of the impacts of climate change. Many countries have produced such assessments, often with support from UNEP or the United States Country Studies Programme. However, very few countries have undertaken impact assessments for health. These include: United Kingdom, United States, the Netherlands, and some developing countries with the United States Country Studies Programme.

There is a potential for WHO to develop methods for climate impact assessments and promote these through workshops, training, and the publication of guidelines. This would also promote capacity building in Member States. As different impacts of climate change are likely in different regions, the WHO Regional Offices should develop regional guidelines. (WHO-EURO-ECEH has already planned to develop methods for climate health impact assessment together with the LSHTM, first overview will be presented at the ISEE/ISEA'99 Conference in Athens, September 5-8).

a) mitigation options and clean development

Mitigation refers to actions to reduce both the emissions of greenhouse gases and the enhancement of carbon sinks. All countries (parties to the UNFCCC) must produce national inventories of greenhouse gas emissions. Countries could be encouraged to address the **A**win-win@ benefits of reduced health impacts of air pollution (particulates) associated with reductions in fossil fuel combustion. WHO could support research in this area (as the scientific basis of the advocacy role), as well as the implementation of Clean Development Mechanisms under the UNFCCC. Identifying the health benefits of providing clean energy is an approach within the remit of Sustainable Development and may be more attractive to WHO. A report on entitled **A**Near-term Health Benefits of Greenhouse Gas Reductions: A proposed assessment method and application in two energy sectors of China@ (Doc. No. WHO/SDE/PHE/99.1, available in http://www.who.int/peh/Information_resources/on_line_documents.htm) has been prepared..

b) adaptation assessment

The development of guidelines for the evaluation of adaptation strategies is an important additional task for national impact assessments. Adaptation options to reduce the health impacts of climate change should be incorporated in all National Impact Assessments. However, very little attention has been focused on adaptation in both the research and policy arenas. There should be mechanisms to allow policy makers to evaluate different adaptation options. Adaptation options specifically for climate-sensitive diseases will need to be evaluated for cost-effectiveness, like any other health intervention.

Planned and autonomous adaptation to climate vulnerability and weather extremes will, to a large extent, reduce vulnerability to long term climate change, therefore, the two issues should be addressed simultaneously. However, there may be some additional activities that are needed to

address the latter problem. EURO-ECEH could take the lead in this activity, as they are proceeding with an EU Fifth Framework proposal that addresses adaptation.

II. Workshop in Tonga on the impact of climate change on small island states

Funding is available for a workshop in Tonga on the impact of climate change on Small Island States. The objectives of the workshop may include:

- C review of vulnerability to the health impacts of climate change;
- C information exchange, capacity building,
- C development of strategies for climate and health impact assessment;
- C development of strategies to prevent and protect communities on the islands
- C list recommendations for similar environments/communities (small island states).

The organisation of the workshop could be undertaken by the Western Pacific Regional Office, in association with the Healthy Islands Initiative of WHO. Dr Jonathan Patz, Johns Hopkins School of Occupation and Environmental Medicine, U.S., may participate in drafting the background document for the workshop. The activities of the workshop should include, and build upon current activities which address the impact of sea level rise on small islands, for example, within the IPCC. Additional sources of funding may need to be identified to expand the focus of the workshop, which is likely to be held in July 2000.

III. Information exchange

WHO should concentrate on information exchange as this is clearly a central role of the Organization. WHO will regularly produce updates on climate, climate change and health as well as a supporting website. The website will act as clearing house for climate-health information and to other reputable website on this issue (Appendix F). Information exchange will contribute to the advocacy role of WHO with respect to climate change, as health impacts are of great public concern. The Department of Protection of the Human Environment (PHE) has a policy on producing fact sheets on all topics, and documents are made available on the web site to improve access. Linkages should be established with the Regional Offices to update HQ on climate and health initiatives, and vice versa. WHO-ECEH has already opened a web-site where information on climate and health can also be accessed (<http://www.who.it>)

IV. Joint publication of book on Climate and Health by WHO, WMO, and UNEP

In view of the large amount of work involved in preparing the health chapter for the IPCC Third Assessment Report (TAR), it may be opportune to combine this process with another product. Therefore, it was suggested that a publication on climate and health could be produced jointly by WHO, WMO and UNEP, which may include the following sections:

- C Introduction to global environmental change issues (climate change in context);

- C Climate change and human health, i.e. the health chapter from the IPCC Third Assessment Report;
- C Climate variability and human health, including the impacts of El Niño on health.
- C Conclusions and discussion.

Prof. A.J. McMichael will approach the IPCC Secretariat, the health chapter writing teams to request permission to reproduce the TAR health chapter in full as well as the relevant sections from the regional chapters. The book would appear shortly after the publication of the TAR due in early 2001.

Other topics where monographs are needed include:

- C Early warning systems and lessons learned;
- C Health benefits of mitigation policies;
- C Benefits from Clean Development Mechanisms

V. *Collaborative research*

There are many gaps in knowledge and activity relating to climate and health. Data-related shortcomings include the lack of coordination of data sets relevant to climate and health. There is also a lack of indicators of human health effects. WHO-ECEH has already initiated the process on the identification of climate/health indicators for the European Region. In order to avoid overlapping and to assure a co-ordinated approach, already existing WHO datasets on infectious disease could be analysed in relation to climate variation, e.g. cholera, food-borne disease. This work could be done in collaboration with academic institutions, and should be Region and country specific.

VI. *Seasonal forecasting and epidemic malaria*

Projects which reduce the burden of malaria in vulnerable regions clearly fit within the stated objectives of WHO. Recent studies have demonstrated links between El Niño, and interannual climate variability and the risk of malaria in Asia, South America and Africa. Recent advances in the ability to forecast climate 3-6 months ahead provide an opportunity to improve epidemic preparedness in vulnerable regions. Many other meteorological products are also available and intersectoral collaboration between health and meteorological agencies should be supported.

WHO could develop a project which uses seasonal climate (El Niño) forecasts to improve epidemic preparedness within the local health sector. Some research has already been undertaken in this area. There has been a pilot study in southern Africa (MALSAT/Liverpool School of Tropical Medicine/UK Met Office), and Dr Martin, Ispra, is also keen to develop a project in East Africa. Such an activity would be advantageous because it requires collaboration across many sectors and agencies, such as WMO, the local NMHS, the local health sector, WHO Regional Office, researchers, and the forecast providers. Such a project would build local capacity in epidemic

preparedness and the use of forecast information, which is also an objective of the WMO CLIPS programme. The project could also evaluate the cost-effectiveness of the forecast information and develop guidelines for use in other countries/areas, in collaboration with ongoing projects organised by ORSTOM, NOAA-OGP, IRI, and WMO. Proposed activities from WHO would need to be integrated with the Roll Back Malaria Programme.

VII. Heatwave watch warning systems

UNEP and U. Delaware developed initial plans for the implementation of Hot Weather Watch Warning Systems. These are now being implemented in selected cities (Rome, Shanghai) as showcase projects together with WMO, USEPA and WHO. These projects are in the process of being set up in collaboration with Dr Larry Kalkstein of the University of Delaware. ECEH-Rome is now involved in the Rome implementation and WHO (HQ and WPRO) are involved in the Shanghai project, and these activities could be expanded. An evaluation of effectiveness of such systems is still missing and could be approached by WHO.

4. Identification of partnerships

There are many other agencies involved in issues addressing climate, climate change and health. This list is not comprehensive but aims to address all those agencies with active interests in health with whom WHO could form partnerships.

Climate Change

The Intergovernmental Panel on Climate Change (IPCC, co-sponsored by WMO and UNEP) was set up in 1988 to formally assess the science of climate change and its potential impacts on a variety of sectors. Currently, the Third Assessment Report (TAR) is underway (see above). WHO has been involved in the IPCC process (see above).

UNEP has co-sponsored, with Vrije Universiteit Institute for Environmental Studies, in the Netherlands, the "Handbook on Methods for Climate Change and Impact Assessment and Adaptation Strategies" which includes a chapter for health. Version 2.0 was published in October 1998. WHO and UNEP will meet in August 1999 to discuss a Memorandum of Understanding. Climate and health should be a priority on that Agenda.

Climate variability, ENSO, and seasonal forecasting.

Within WMO there are several groups:

- C CLIPS - Climate Information and Prediction Services which supports member states to improve their capacity for producing or responding to climate forecasts;
- C WCRP - World Climate Research Programme;
- C World Climate Impact Assessment and Response Strategies Programme, in

- C conjunction with UNEP;
 C Committee on Climate and Human Health, part of the Commission on
 Climatology;

UNEP Atmosphere Division has supported ENSO related activities, such as workshops on Usable Science and the use of seasonal forecasting for disaster preparedness, particularly famine early warning systems. UNEP Health and Wellbeing Unit (Dr H Gopalan) has also supported activities on climate and health, including the establishment of the Hot Weather Watch/Warning system in Rome.

The International Human Dimensions of Global Change Programme (IHDP) is an international multi-disciplinary scientific activity that address the social causes and impacts of global change. IHDP is keen to be involved with the health implications of climate variability and climate change. IHDP, jointly with UNEP are currently sponsoring four workshops on global environmental change and health:

- C Health Research Methods and Data, Turku, Finland, in July 1999
 C Climate Variability Extreme events and Health, Maastricht
 University, the Netherlands, in September 1999
 C Health and urbanization, Delhi, India, in October 1999
 C Health and Resources, Jamaica, West Indies, in November 1999

The U.S. National Ocean and Atmosphere Association is very active in ENSO. The Office of Global Programmes has convened workshops and funded research. The ENSO Experiment is a collection of research projects that addresses the impact of the last El Niño (1997/98) on diseases such as malaria, dengue, arboviruses, cholera and hantavirus pulmonary syndrome.

The U.S. Environmental Protection Agency (USEPA) is in the process of preparing a 10 year strategy in this area. There is health effects research commitment for both climate issues and climate change. Currently USEPA is sponsoring a study by the National Academy of Science to examine existing research on climate and infectious diseases, in order to extract the evidence from core studies. Four main areas of concern have been identified: human health; air quality effects; water quality effects; and ecosystem impacts. USEPA is also co-sponsoring the development of heat/health watch-warning systems with WMO. A project will be done in Shanghai, to which WHO has been invited to participate. Further work related to morbidity effects of heat stress needs to be addressed.

The U.S. National Institutes for Environmental Health (NIEHS) is also active in this area of climate and human health. Representatives of NIEHS met with WHO in April 1999 to discuss the implementation of joint activities.

Monitoring networks

It is important to establish linkage mechanisms with other monitoring networks. WHO cannot support data collection activities directly, but may provide health input for monitoring networks that are already established for global change, for example:

- C NoLIMITS (Networking of Long-term Integrated Monitoring in Terrestrial Systems) is an EU-funded network of sites for long-term integrated monitoring which addresses local, national, European and global scale requirements for policy-relevant data on environmental change.
- C The Global Terrestrial Observing System has recently been set up under the auspices of UNEP, UNESCO, FAO and WMO, to detect and monitor the responses of terrestrial ecosystems to global change. GTOS is interested in monitoring societal and health indicators and a representative attended the second meeting of the ECEH Working Group in October 1998.

It is clearly important to develop and maintain joint activities. Climate variability and change are intersectoral issues and interagency collaboration is an essential component for strategies to address the impacts of climate on health.

5. Creation of a Task Force on Climate and Health

Task Forces are internal WHO activities for cross-cluster facilitation and for communication with Regional Offices. However, because climate is a cross-sectoral issue, it may be appropriate to include external agencies, e.g. WMO, UNEP, IDNDR, as a full member of the Task Force rather than as observers.

Within WHO, potential areas for participation in the Task Force include:

- C Emergencies
- C Food safety
- C Food security/nutrition
- C Roll Back Malaria programme
- C Communicable diseases
- C Healthy Cities/Healthy Islands
- C Sustainable development

It was proposed that some Regional Offices could undertake activities of special relevance to their region, for example:

- C EURO is committed to implement the actions proposed in the London Declaration, namely: monitoring, adaptation strategies; national climate -health impact assessments, networking and research
- C AFRO could focus on malaria;
- C PAHO could focus on El Niño and emergencies;

- C WPRO could focus on the impacts in Small Island States
- C SEARO could focus on heatwaves and vector borne diseases
- C EMRO could focus on issues related to water stress

The meeting concluded with a lunchtime presentation that was jointly presented by Profs. McMichael and Haines, (abstracts in Appendix G).

Appendix A - Agenda

Climate and Health Working Group Meeting

18 May, 14:00-17:00 - Room L132

19 May, 9:00-12:00 - Room L 132

Lunchtime seminar, 19 May 13:00-14:00 Room M 105

PHE/OEH will hold a working group meeting on Climate and Health, leading to the formation of a Task Force in this area. For this purpose we are organizing a brainstorming meeting on the two half days, on the afternoon of the 18th and the morning of the 19th May, 1999.

In order to make best use of the time of several outside visitors (UK, Rome, WMO), the meeting will be divided in two parts. On the 18th we will have a general brainstorming meeting to discuss issues of direction and areas on which our Climate and Health activities should focus. For this purpose we have invited Drs McMichael and Kovats (LSHTM) to Geneva. Staff from ECEH-Rome (Drs Bertollini and Menne) will also be present.

On the 19th we will discuss the formation of a Task Force on Climate and Health. Staff from WMO, LSHTM and Prof Haines (UK) will also attend this day. You are most welcome to attend both days, but if time is a constraint, the second day (19th) will be most useful as we will discuss ways in which our department, cluster, inter-cluster and activities with other organizations should interact in this area of increasing importance.

DRAFT AGENDA

1. Overview of current activities in issues related to climate and health in WHO
2. Discussion to identify priority areas for WHO
3. Cabinet paper on the Climate and Health Agenda
4. Identification of partnerships: Joint activities with WMO, other international agencies and institutions
5. Creation of a Task Force on Climate and Health
6. Recommendations for WHO approach
7. Other business

Appendix B: List of Participants

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Appendix C: WHO/UNEP Fact sheet on climate change (revised May 1999)

Information sheet 14

Human health

Climate change is expected to have wide-ranging consequences for human health. Public health depends on sufficient food, safe drinking water, secure shelter, good social conditions, and a suitable environmental and social setting for controlling infectious diseases. All of these factors can be affected by climate.

Any increase in the frequency or intensity of extreme weather events would pose a threat. Heat waves, flooding, storms, and drought can cause deaths and injuries, famine, the displacement of populations, disease outbreaks, and psychological disorders. While scientists are uncertain how climate change will affect storm frequency, they do project that certain regions will experience increased flooding or drought. In addition, coastal flooding is expected to worsen due to sea-level rise unless sea defences are upgraded.

Heatwaves are linked to cardiovascular, respiratory, and other diseases. Illness and deaths from these causes could be expected to increase, especially for the elderly. A greater frequency of heat episodes and anti-cyclonic conditions may worsen air quality in many cities. On the other hand, milder winters in temperate climates would probably reduce cold-related deaths in some countries.

By reducing fresh water supplies, climate change may affect water resources and sanitation. This in turn could reduce the water available for drinking and washing. It could also lower the efficiency of local sewer systems, leading to increased concentrations of pathogens in raw water supplies. Water scarcity may force people to use poorer quality sources of fresh water, such as rivers, which are often contaminated. All of these factors could result in an increased incidence of diarrhoeal diseases.

Food security may be undermined in vulnerable regions. Local declines in food production would lead to more malnutrition and hunger, with long-term health consequences, particularly for children.

The geographical distribution of species that transmit disease may be altered. In a warmer world, mosquitoes, ticks, and rodents could expand their range to higher latitudes and higher altitudes. Approximately 45% of the world's human population presently live in regions suitable for malaria transmission. Climate change impacts models suggest that the largest changes in the potential for disease transmission will occur at the fringes -- in terms of both latitude and altitude -- of the current malaria risk areas. Generally, people in these border areas will not have developed immunity to the disease. The seasonal transmission and distribution of many other diseases that are transmitted by mosquitoes (dengue, yellow fever) and by ticks (Lyme disease, hantavirus pulmonary syndrome, tick-borne encephalitis) may also be affected by climate change.

People will have to adapt or intervene to minimize these enhanced health risks. Many effective measures are available. The most important, urgent, and cost-effective is to rebuild the public health infrastructure in countries where it has deteriorated in recent years. Many diseases and public health problems that may be exacerbated by climate change can be effectively prevented with adequate financial and human resources. Adaptation strategies can include infectious disease surveillance, sanitation programmes, environmental management, disaster preparedness, improved water and pollution control, public education directed at personal behaviour, and training of researchers and health professionals.

Assessing the potential health effects of climate change involves many uncertainties. Researchers must consider not only future scenarios of climate change but many non-climate factors as well. For example, trends in socio-economic conditions can have a major affect on a population's vulnerability. Clearly, poorer communities will be more vulnerable to the health impacts of climate change than rich ones.

Appendix D: Executive Summary from the WHO-ECEH Policy Document for the 3rd Ministerial Conference on Environment and Health in Europe.

Early human health effects of climate change and stratospheric ozone depletion in Europe

Human-induced changes in the global climate system and in stratospheric ozone pose a range of health risks. Irrespective of any actions that might soon be taken to reduce or halt these environmental changes, human populations will be exposed to some degree of climate change and increased ultraviolet irradiation over the coming decades. There is therefore a need to consider how these global change processes will affect the health of European populations, how to improve research and monitoring, how to minimize adverse health impacts, and how to achieve Europe-wide coordination, sharing of information, and participation in wider international efforts in this area.

To this end, a WHO working group has made a number of recommendations, which are summarized below.

Support the establishment of a Europe-wide interagency network for monitoring, researching and reviewing the early human health effects of climate change and of stratospheric ozone depletion, developing and advocating prevention, mitigation and adaptation policies, and identifying specific research priorities in that field. The WHO European Centre for Environment and Health should act as a coordinator of this network, as part of the global programmes under the Inter-Agency Committee on the Climate Agenda endorsed in 1998 by the World Health Assembly, and link it to other relevant global programmes such as those arising from the United Nations Framework Convention on Climate Change and the Montreal Protocol on Substances that Deplete the Ozone Layer.

Support interdisciplinary research into the study and forecasting of health impacts of climate change and stratospheric ozone depletion, focusing particularly on health outcomes relevant to European populations, and ensure that funding is available for this purpose. Related disease monitoring and research networks should be strengthened. Professional education and training, with an emphasis on acquisition of the necessary interdisciplinary understanding and research skills, should also be strengthened.

Support the identification, development, standardization, evaluation and broad use of systems for monitoring and assessing changes in environmental indicators, bio-indicators of health risk and impacts on health, and indicators of population health status across Europe. These systems must be coordinated with global monitoring activities.

Develop capacities, as necessary, to undertake national health impact assessments, with the aim of identifying the vulnerability of populations and subgroups, and ensure the necessary transfer of know-how among countries. These assessments will be made available for possible consideration in the forthcoming Third Assessment Report of the Intergovernmental Panel on Climate Change.

Carry out ongoing reviews of the social, economic and technical prevention, mitigation and adaptation options available to reduce the adverse impacts of climate change and stratospheric ozone depletion on human health. Support the implementation of prevention, mitigation and adaptation strategies, taking into account national impact assessments (e.g. by strengthening surveillance activities), with appropriate public education and with special reference to vulnerable groups.

Orient the activities of bilateral and international donor agencies and other interagency bodies to provide resources and technical assistance to countries in need, for the implementation of both mitigation and adaptation strategies. These strategies should be designed to reduce the short- and long-term health impacts of climate change, fossil fuel combustion and stratospheric ozone depletion.

Appendix E: Summary Paper on the Climate and Health Agenda (Draft Cabinet Information Paper)

Background:

As a response to the requirements stated in Agenda 21 and the UN Framework Convention on Climate Change (UNFCCC), a number of organizations carrying out significant climate related activities, jointly developed the Climate Agenda. This is a comprehensive and integrating framework of all aspects of international climate related programmes, including data collection and application, climate system research and studies of socio-economic and health impacts of climate variability and their effects on ecosystems. The international organizations participating in the Climate Agenda include FAO, UNEP, UNESCO and its Intergovernmental Oceanographic Commission (IOC), WHO, WMO and the International Council of Scientific Unions (ICSU). WHO's participation was endorsed at the 51st World Health Assembly.

WHO contributes towards the health aspects of the Climate Agenda, within the general field of "climate impact assessment and response strategies to reduce vulnerability". This activity focuses on understanding the socioeconomic (including health) and environmental impacts of climate variability (such as extreme weather events) and prospective climate change. The purpose of these assessments are to improve the ability of countries to assess their vulnerabilities, conduct climate impact studies and to devise response strategies.

Regarding climate change issues, following the publication of the joint WHO/UNEP/WMO report "Climate Change and Human Health" and the Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), both in 1996, there has been increasing recognition of the multiplicity of ways in which climate change can affect human health. A joint inter-agency activity being planned with WMO, UNEP, USEPA and U. Delaware, is a watch warning system for heat waves, to be implemented in Shanghai. In addition to the direct health consequences of heatwaves, in many countries a pattern of increased incidence of food borne diseases is often observed during the time of the year when temperatures are warmest. The factors contributing to this increased incidence are not fully understood, however on the hottest days, increased rates of microbial growth can result in disease-producing levels of microorganisms or toxins in a much shorter time period than normal. Regarding climate variability, the improvement of early warning systems offer a greater opportunity for reducing health impacts. A report on "El Niño and Health" is currently being reviewed for publication by WHO. WHO has a focal person dealing with the inter-agency Task Force on El Niño, coordinated by IDNDR.

Recommendations:

In order to coordinate the relevant activities of the Climate Agenda, in the second session of the Inter-Agency Committee on the Climate Agenda (IACCA), held in Geneva in 1998, the establishment of an Inter-Agency Network on Climate and Human Health, with a secretariat coordinated by WHO was discussed.

The proposed work focuses on three areas, as follows:

I. Capacity building. Assisting Member States in: a) undertaking national assessments of climate-induced human health impacts; b) determining and meeting capacity-building and research needs in order to identify and address priority areas; c) identifying and implementing adaptation strategies and preventive and mitigating measures, designed to effectively reduce adverse health impacts.

II. Information exchange work. a) provision of information to Member States, national and international training and research institutions, and to the public at large, on the state-of-the-art in the global research effort on climate and health interactions, their consequences for population health and for public health response; b) fulfilling “clearing house” functions to ensure free access to information including databases needed for research on climate variability and climate change on human health in developing countries, in particular with regard to databases held in international agencies and in national institutions in developed countries.

III. Research promotion. a) to serve as the UN-based lead group of institutions and experts for the guidance of research programmes on the human health implications of climate and of global environmental change, including the impacts of climate variability, climate change and stratospheric ozone depletion.

Similar recommendations are being proposed for EURO at the Third Ministerial Conference on Environment and Health (London, 16-19 June, 1999), but with focus on climate change and stratospheric ozone depletion in Europe.

WHO should undertake this activity in close collaboration with initiatives in the Regions. In addition, a coordination mechanism needs to be developed in order to divide tasks among Regions according to needs and experience and therefore make better use of WHO-wide resources.

Conclusions:

PHE needs to pool expertise and human resources within WHO and set up an inter-cluster Task Force to operate at HQ, with regular contact and exchange with focal persons in each Regional Office.

PHE should proceed with establishing an Inter-Agency Network on Climate and Human Health, to implement the proposed work, and to prioritize the activities based on needs and available resources.

Appendix F: Draft plan of WHO website on climate and health

Introductory page:

- C Brief description of climate variability and change and relevance to human health and sustainable development,
- C Reference to stratospheric ozone depletion and UV which has its own WHO page (INTERSUN), and will include revised diagram/illustration.

Background on climate variability, El Niño and human health:

- C summary of current assessments
- C research gaps/agenda
- C WHO activities

Background on climate change and human health:

- C summary of current assessments
- C research gaps/agenda
- C WHO activities

List of WHO publications:

- C fact sheets
- C reports

Linkages to other reputable sites:

- C El Niño research/impacts: PAHO, NOAA, NCAR/ESIG, BoM, UN InterAgency Task Force on El Niño.
- C El Niño forecasting applications: IRI, WMO-CLIPS, NOAA.
- C research groups on health impacts: University of Delaware, Johns Hopkins University, London School of Hygiene and Tropical Medicine, International Centre of Integrative Studies at University of Maastricht, EU Joint Research Centre at Ispra
- C WHO Regional Offices: PAHO, EURO
- C climate change activities: IPCC, UNFCCC, USEPA, etc.
- C Climate change impact assessments (methods and reports): IPCC, ACACIA (EU), US Country Studies Programme, national assessments (e.g. US) etc.

Current website: (http://www.who.int/peh/climate/climate_and_health.htm).

Appendix G: Summary of presentations from the lunchtime seminar held on Wednesday 19 May 13:00-14:00, Room M-105, at WHO Geneva.**1. Global Climate Change: Does Global Warming Warrant a Health Warning?**

Professor Tony McMichael
Dept of Epidemiology and Population Health
London School of Hygiene and Tropical Medicine
Convening Lead Author, Health Impact Chapter, IPCC Assessment Report

Human societies over the ages have degraded local ecosystems and modified regional climates. Today, the aggregate human impact has attained an unprecedented global scale, reflecting rapid increases in population size and in energy-intensive, high-throughput consumerism. We are therefore now encountering unfamiliar human-induced changes in composition of the lower and middle atmospheres and world-wide depletion of various other natural systems (e.g. soil fertility, aquifers, ocean fisheries, and biodiversity in general). Although we readily recognise that such changes would affect economic activities, infrastructure and managed ecosystems, we have been less attuned to the idea that such large-scale environmental change would weaken the supports for healthy life. Scientists are beginning, now, to clarify and to model those risks to health, particularly the risks due to global climate change.

Climate change is likely to change the frequency of extreme weather events; for example, tropical cyclones may increase as sea-surface waters warm; floods may increase as the hydrological cycle intensifies; and heatwaves may increase in mid-continental locations. A change in the frequency and intensity of heatwaves and cold spells would affect seasonal patterns of morbidity and mortality. The production of various air pollutants and of allergenic spores and pollens would be affected by warmer and wetter conditions. Climate change is also expected to affect health via various indirect pathways: it may alter the geography of infectious diseases (especially vector-borne diseases such as malaria and dengue which are very sensitive to changes in climatic conditions), the yield of food-producing systems on land and at sea, the availability of freshwater, and, by contributing to biodiversity loss, may destabilise and weaken the ecosystem "services" upon which human society depends.

This topic is likely to become a major theme in public health research, policy development, and advocacy early in the coming century. It will be central to the "sustainability transition" debate.

2. El Niño and Health

Professor Andy Haines
Head of Department of Primary Care and Population Sciences,
Royal Free and University College School of Medicine,
University College London.

El Niño events last around 12-18 months and occur every 2-7 years. They are characterised by warming in the eastern Pacific accompanied by changes in atmospheric pressure between the east and west of the Pacific. It affects climate in many parts of the world by distant connections (teleconnections) and has wide ranging impacts on health. There is a strong association between the El Niño cycle and the numbers of persons affected by natural disasters around the world, the effect is particularly strong in the case of drought.

The incidence of a number of vector-borne diseases is affected substantially by the El Niño cycle, for example malaria in Venezuela, Colombia and North east Pakistan. Associations have also been described for dengue in some south Pacific islands and Murray Valley Encephalitis in Australia. There are a growing number of studies investigating possible links between El Niño and a range of diseases such as cholera, algal biotoxin related diseases (fish and shellfish poisoning) and hantavirus pulmonary syndrome. The increasing potential of seasonal forecasts to give early warning of El Niño events has considerable promise for public health by, for example, strengthening disaster preparedness and vector control programmes.

Appendix H: Recent WHO, WMO and UNEP publications on climate and health (1996-1999)

Kovats RS, Menne B, McMichael AJ, Bertollini R (1999) Early Human Health Effects of Climate Change in Europe [background document]. European Centre of Environment and Health, Rome.

McMichael AJ, Haines A, Slooff R, Kovats RS, eds. (1996) *Climate Change and Human Health: an Assessment by a Task Group on behalf of the World Health Organization, the World Meteorological Organization and the United Nations Environment Programme*. Geneva, WHO [WHO/EHG/96.7]

PAHO (1998) *The health impact of the El Niño phenomenon*. Central American workshop held in San Jose, Costa Rica, 3-5 November 1997.

PAHO (1998) *El Niño and its impact on health*. Report presented to 122nd Executive Assembly of PAHO May 1998. Document CE122/10.

Wang X, Smith K. Near-term Health Benefits of Greenhouse Gas Reductions: A proposed assessment method and application in two energy sectors of China. Doc. No. WHO/SDE/PHE/99.1. WHO, 1999

WHO (forthcoming) *El Niño and Health*. Geneva, WHO.

WHO/MRC/UNEP (1998) *First InterAgency Climate Change and Human Health Monitoring Workshop, 14-15th October 1997*. Medical Research Centre, London.

WMO (1999) *Climate, Weather and Health*. Geneva, WMO. [booklet for World Meteorological Day 1999]

Working Group on the Early Human Health of Climate Change in Europe (1999) Policy Document, also two meeting reports.

Appendix I: Acronym list

APHEA - Air Pollution and Health, European Approach
AFRO - Regional Office for Africa (WHO)
BoM - Bureau of Meteorology, Australia
CLIPS - Climate Information and Prediction Services (WMO)
EC - European Commission
ECEH - European Centre for Environment and Health, Rome division (WHO)
ENSO - El Niño/Southern Oscillation
EMRO - Eastern Mediterranean Regional Office (WHO)
ESIG - Environmental and Social Impacts Group (NCAR)
EU - European Union
EURO - European Regional Office (WHO)
FAO - Food and Agriculture Organization
GCOS - Global Climate Observing System
GTOS - Global Terrestrial Observing System
IACCA - InterAgency Committee on the Climate Agenda
IAI - Inter-American Institute for Global Change Research
IDNDR - International Decade of Natural Disaster Reduction (UN)
IHDP - International Human Dimensions of Global Change Programme
IPCC - Intergovernmental Panel on Climate Change (WMO/UNEP)
IRI - International Research Institute for Seasonal-to-Interannual Prediction
ISEA - International Society for Exposure Assessment
ISEE - International Society for Environmental Epidemiology
LSHTM - London School of Hygiene & Tropical Medicine
MALSAT - (Project on environmental information systems for Malaria)
NCAR - National Center for Atmospheric Research, US
NIEHS- National Institutes of Environmental Health, US
NMHS - National Meteorological and Hydrological Service
NOAA- National Oceanic and Atmospheric Administration, US
NOAA-OGP- Office of Global Programmes of NOAA
NoLIMITS - Networking of Long-term Integrated Monitoring in Terrestrial Systems
ORSTOM - (French scientific research institute for development through cooperation)
PAHO - Pan American Health Organization
SADC- Southern Africa Development Community
SEARO - South East Asia Regional Office (WHO)
TAR - Third Assessment Report
UNEP - United Nations Environment Programme
UNFCCC - United Nations Framework Convention on Climate Change
USEPA - US Environmental Protection Agency
UNESCO - United Nations Educational, Scientific and Cultural Organization
WCRP - World Climate Research Programme
WMO - World Meteorological Organization
WPRO - Western Pacific Regional Office (WHO)

Introduction: Climate change is a global emergency that influences human health and occupational safety. Global warming characterized by an increase in temperature of the ambience and humidity affects human health directly impairing body thermoregulation with serious consequences: dehydration, fatigue, heat stroke and even death. Several studies have demonstrated negative effects of climate change on working populations in a wide variety of workplaces with particular regard to outdoor and uncooled indoor workplaces. Most vulnerable workers are outdoor workers in tropical and subtropical countr Organizational climate is the result of a combination of elements that affect the way team members perceive their workplace. A business climate can be affected by motivation, delegation, authority, feedback and attitudes. In a positive organizational climate, you and your colleagues may be more motivated, more productive and enjoy better morale. There are many elements that make up a workplaceâ€™s organizational climate, but some of the most important includeÂ You can reward your team based on measurable performance metrics, such as a pay bonus when meeting a specific sales target. Other rewards might include additional days off, an appropriate gift or a similar perk. Praise is also an informal award that effectively shows employees that you value their work and effort. Climate change can affect human health in a variety of ways. It can increase the risk of infectious diseases, heart-related conditions, pollution, and more.Â Changes in air quality from climate change may impact a personâ€™s physical and mental health. Extremes in weather and temperature, increased pollution and environmental toxins, and changes in food security can all cause physical and mental health problems. Climate change is affecting some of the essential factors that influence human health, including