

Research to Assess the Impact of Climate Change on Communicable Diseases

*Report of an Informal Consultation
Kolkata, India, 24-26 August 2009*

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Printed in India

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1. Background

Global climate change is expected to have long-range effects on ecological systems and pose a greater risk of various infectious diseases, specifically diarrhoea and other vector-borne diseases if it occurs at the level that has been projected by global models. It is known that global warming is of particular concern as it creates warmer and wetter conditions that significantly increase the risk of infection. Thus, these projections could affect the health of billions of people globally and create several socioeconomic problems with increased suffering to the poorest in the community. Therefore, it is necessary to focus on improved research capacity development for modelling the pattern of disease distribution in the changing climate scenario.

In this regard, WHO organized an Informal Consultation on Research to Assess Impact of Climate Change on Communicable Disease from 24 to 26 August 2009 in Kolkata, India.

2. Specific objectives of the consultation

The specific objectives of the consultation were:

- To review draft generic research protocols on assessing the impact of climate change on communicable diseases.
- To discuss plans for application of the generic research protocols in the Member countries of the South-East Asia Region.

Organizing agency

The World Health Organization (WHO), Regional Office for South-East Asia, and the National Institute of Cholera and Enteric Diseases (NICED), Kolkata were the organizing agencies.

Partner agencies

WHO Kobe Centre, Japan.

Participants

Representatives from Member countries, viz. Bangladesh, Bhutan, India, Indonesia, Nepal, Sri Lanka and Thailand.

Chair: Dr Nalini Sathiakumar, Associate Professor, Department of Epidemiology, UAB Sparkman Centre for Global Health, University of Alabama, Birmingham, USA.

Rapporteur: Dr (Ms) S.H. Meegaskumbura, Department of Zoology, University of Peradeniya, Peradeniya, Sri Lanka.

List of participants: For full list of participants, see Annex 2.

3. Salient features of the consultation

The consultation discussed the following *objectives and made observations*:

3.1 Objective 1:

To enhance knowledge on some examples of past and ongoing research in the Region on climate and communicable diseases:

- Presentations by Dr A Sattar Yoosuf, Director, SDE; Dr Jai P. Narain, Director, CDS; Dr A.P. Dash, RA-VBN provided information on research priorities and challenges in the context of climate change and its health impacts which were valuable in providing perspectives of the proposed research initiatives.
- Dr A K M Siddiqui of the International Centre for Diarrhoeal Disease Research (ICDDR), Dhaka, and Dr Supratman Sukawati, Scientist, National Institute of Health Research and Development, Ministry of Health, Jakarta, provided excellent examples of how a simplistic approach to using existing data on climate factors and cholera and on climate factors and malaria

has the potential to generate valuable information contributing to the evidence base.

3.2 Objective 2:

To discuss draft protocols developed for WHO by the National Institute of Cholera and Enteric Diseases and the National Institute of Malaria Research:

- The purpose of these six protocols is basically to strengthen the methodology and use them as common protocols in Member countries with the ultimate goal of increasing the evidence base in the Region for intervention;
- The following six protocols were discussed (presenter's name in brackets):
 - (1) Retrospective Study: Evaluation of the Impact of Climate Change on the Occurrence of Diarrhoeal Diseases with Emphasis on Cholera (Dr Alok Kumar Deb, Scientist 'D', National Institute of Cholera and Enteric Diseases, Kolkata).
 - (2) Retrospective Study: Evaluation of the Impact of Climate Change on Vector-Borne Diseases (Dr R.C. Dhiman, Scientist 'F', National Institute of Malaria Research (ICMR), New Delhi).
 - (3) Prospective Study: Evaluation of the Impact of Climate Change on the Occurrence of Diarrhoeal Diseases with Emphasis on Cholera (Dr Suman Kunango, Scientist 'B', National Institute of Cholera and Enteric Diseases (NICED), Kolkata).
 - (4) Prospective Study: Evaluation of the Impact of Climate Change on Vector-Borne Diseases (Dr R.C. Dhiman, Scientist 'F', National Institute of Malaria Research (ICMR), New Delhi).
 - (5) Climate Change and Diarrhoea: Preparedness and Response Capacity (Dr Anup Palit, Scientist 'E', National Institute of Cholera and Enteric Diseases (NICED), Kolkata).
 - (6) Climate Change and Vector-Borne Diseases: Preparedness and Response Capacity (Dr R.C. Dhiman).

3.3 General comments on the above six protocols:

- The protocols would be modified according to the WHO guidelines for research protocols and provide more specific details.
- The background section should be very specific and relevant to the study. All of the climate variables and covariates (non-climate variables) and their association with the outcome of interest need to be summarized and presented in a concise manner. The rationale (last paragraph of the background) should present the compelling reasons for conducting the study and its expected impact.
- The specific aims should be revised to enhance clarity.
- The case definition should be uniform and consistent with existing WHO definitions.
- The method of collection and handling of variables pertaining to climate factors, outcome (health) variables and other covariates (non-climate factors) need to be discussed in detail – data source, frequency and unit of measurement and handling of the data in analysis.
- Use of flowcharts, when applicable, is very useful.
- The analytical plan is best handled as per each specific aim and from the beginning with a descriptive analysis going on to multivariable analysis. The analytical plan should be concise, limited to the variables to be analysed and the type of analysis. The software that is recommended for analysis should be mentioned. The detailed description of the actual outputs from the analysis may be moved to an appendix if thought to be useful to be included in the current protocol. It may be useful to develop such details as the study progresses as part of capacity building.
- Quality control should be discussed for the appropriate sections – data collection procedures and analysis.
- It was generally agreed that the protocols would specify plans to engage stakeholders at the outset and plans on dissemination of results.

- The section on human subjects needs to be addressed. The informed consent process must be discussed if there is subject contact.
- All studies will need to have formal approval from the appropriate ethics committee to conduct the study (even if it pertains to existing data).
- Retrospective studies on diarrhoea and vector-borne diseases.
- There was general consensus that the protocols for diarrhoea and vector-borne diseases would be combined into a common protocol.
- The minimum set of data that would be needed to conduct this study is provided (see attached table). Member countries are requested to assess the availability of such data on their return and provide a feedback to the Working Group (see below).
- Follow-up study on diarrhoea needed: The proposals need to be modified to have a broader application rather than the current focus on the local setting. For example, it would be prudent to collect prospective data on diarrhoea/cholera from sentinel hospitals (urban and rural) and/or primary health-care units building on an existing framework of health-care delivery patterns. The goal is to keep the projects cost-effective by building on the existing framework of health-care delivery systems existing in the country. Therefore, the application of this protocol would differ by country depending on the choice of the selected site(s) – urban hospital and/or rural hospital and/or primary health-care units. Of particular note in conducting these studies is information on non-climate factors.
- Follow-up study on vector-borne diseases: The study has different components. It would be very useful to have a table that enumerated the data that needs to be collected for the study (Dr R.C. Dhiman) and to describe each component with specifics on data collection.
- Preparedness and Response Capacity for Diarrhoeal and Vector-Borne Diseases: Combine the two protocols into one general framework plan.

- Prepare a checklist to assess the current preparedness plan – should be able to identify the strengths and weaknesses of existing health systems.
- Risk and capacity assessment – Mapping of current risk and to identify vulnerable areas; concurrent capacity-building including resource mapping.
- Provide the evidence base to incorporate climate-related events to be factored into the preparedness plan – development of an early warning system. Climate forecasting and predicting disease outbreaks of cholera and/or vector-borne diseases will be extremely useful for planning purposes (will require to develop some modelling/GIS techniques), and for communication to scientific and non-scientific communities.
- Developing and conducting simulation exercises to deal with climate change-related events will enhance the preparedness plans.

Summary:

- The consensus was that there will be a two-tiered approach. First tier – begin with the retrospective study and, second tier – go on to the prospective studies (diarrhoea and vector-borne disease).
- It was also recommended that the retrospective study be immediately undertaken in two countries in 2009, which will help smoothly overcome out the challenges that may occur. The lessons learned from this experience will help to strengthen similar studies in other countries. WHO will help mobilize funding for this initiative (see below).
- Regarding prospective studies on diarrhoea and on vector-borne disease, plans may be crystallized in 2010 and the possibility of seeking competitive funding may be considered depending on the scope and timeline developed by individual countries.
- Preparedness and response capacity protocols will be revised by WHO/NICED/NIMR experts as per the suggested revisions.

3.4 Objective 3:

To determine the potential interest and feasibility of undertaking one or more of the four (one retrospective study, two prospective studies and one preparedness plan) protocols in the Member countries:

- A brief questionnaire ascertaining information on the degree of interest and the participating institutions was completed by the participants. All participating countries were enthusiastic in pursuing further work. Details are provided in the table below.
- Participating countries gave the following information:

COUNTRY MATRIX

Country	Prospective study	Retrospective study	Protocol development	Remarks
Bangladesh	- would provide feedback soon -			
Bhutan	-	v	-	Requested for capacity-building
India	v	v	v	All three studies; TERI would be interested in health and vulnerability impact assessment
Indonesia	-	-	-	Requested for capacity-building and methodology (for data analysis)
Nepal	-	v	-	Requested for training for prospective study
Sri Lanka	-	v	-	
Thailand	-	-	-	Requested for capacity-building

3.5 Objective 4:

To discuss measures to enhance capacity building in the Member countries for optimal conduct of the studies. Member countries would be sending feedback on specific capacity-building needs to CDS/WHO/SEARO:

- Guidance or training in the following areas*:
- Finalizing country-specific protocols.
- Implementation – development of study procedures, and manual of operations (eg. data quality control).
- Training in analytical methods and use of software or, if not feasible, outsourcing of work to other entities in the country.
- Report preparation and paper publication.
- General communication.

3.5 Objective 5:

To develop action items with timelines for follow-up:

- (1) Form a working group or a network on climate change and communicable disease (CCCD-Net)
- (2) Develop an electronic distribution list – for distribution of materials of interest and to serve as a platform for discussing problems as they arise.
 - Dr Nalini Sathiakumar, University of Alabama at Birmingham, USA, will post powerpoint slides on protocol development and a sample proposal.
- (3) Existing work undertaken on climate and communicable disease in each country may be compiled into a scientific report/paper for dissemination.
- (4) Member countries are recommended to develop a core group of experts in the country in the disciplines of epidemiology, statistics, environmental health, and GIS/remote sensing.
- (5) To prepare a short communication for the stakeholders (Drs G.B. Nair, Narain and Sathiakumar).

- (6) Establish networking among Member countries for sharing ongoing initiatives on climate change and communicable diseases.

The following was brought to the attention of the Member States by Dr Jai P. Narain, Director, CDS, WHO/SEARO:

- WHO plans to support the initiation of the retrospective study in two cities in 2009.
- Member countries may apply to WHO for funding as per WHO established mechanisms for research protocols. The WHO protocol format has been made available. Interested Member countries may apply to the WHO Regional Office in New Delhi, India.
- Member countries are encouraged to indicate if funds can be mobilized from their own country sources so that the study may commence early.

4. Recommendations

- (1) The draft generic protocols discussed and commented upon at the consultation will be further revised within two weeks and shared with the participants before finalizing by the end of September 2009. Protocols on the retrospective studies on diarrhoea and vector-borne diseases will be combined. Protocols on the prospective study will remain separate.

(Action: WHO/SEARO, NICED, NIMR)

- (2) Retrospective studies will be initiated in at least two cities during 2009, followed by other countries/cities during 2010 and 2011.

(Action: Member countries, WKC and WHO/SEARO)

- (3) Existing evidence on climate change and communicable diseases in the Member countries should be well documented, such as climate change (CC) and diarrhoea; CC and malaria; and CC and dengue, etc.

(Action: WHO/SEARO and Member States)

- (4) The retrospective studies will be initiated first — with technical and financial support from WHO Kobe Centre and WHO/SEARO followed by prospective studies for which additional resources will be mobilized, both by WHO and from partners.

(Action: WKC, WHO/SEARO)

- (5) As national preparedness and capacity assessment requires an integrated approach to evaluate the public health system, collaboration with similar initiatives is needed. In the context of climate change, a checklist on the specific risk and capacity requirements will be prepared.

(Action: WHO/SEARO in collaboration with partners)



Meeting on progress

Annex 1

Data requirement for the Retrospective study

Climate data		
Temperature	Maximum & minimum	Daily/monthly
	Number of 'hot' days	Monthly
	Number of 'cold' days	Monthly
Rainfall	Total rainfall	Monthly
	Number of rainy days	Monthly
	Number of 'heavy rain' days	Monthly
Relative Humidity	Maximum & Minimum	Daily/monthly
Health data from hospital/treatment facilities community-level data		Monthly
	Number of cases of diarrhoea	Total & by age
	Number of deaths due to diarrhoea	Total & by age
	Number of cases of cholera	Total & by age
	Number of deaths due to cholera	Total & by age
	Number of cases of malaria vivax, falciparum, etc	Total & by age
	Number of deaths due to malaria vivax, falciparum	Total & by age
	Number of cases of dengue	Total & by age
	Number of deaths due to dengue	Total & by age
Essential denominator data – Total population and age distribution For the catchment population/resident population (? With yearly projections)		
Other probable essential data		
	Percentage of population with access to safe water	Yearly
	Percentage of population with access to sanitation	Yearly
	Percentage of population below poverty line	Yearly
	Per capita income	Yearly

Immunization coverage	Yearly
Malnutrition rate	Yearly
Other useful data (but may not be available)	
Sea surface temperature	Monthly
Sea surface height	Monthly
Chlorophyll-a	Monthly
Salinity of inland water	Monthly
Entomological data	Monthly

Annex 2

List of participants

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Annex 3

Programme

Monday, 24 August 2009:

0830 – 0900	Registration
0900 – 0930	Welcome and Opening <ul style="list-style-type: none">• Objectives of the Meeting by Dr A.P. Dash (RA-VBN, WHO/SEARO)• Remarks by Dr A. Sattar Yoosuf (Director, SDE, WHO/SEARO)• Remarks by Dr Jai P. Narain (Director, CDS, WHO/SEARO)• Announcements by Dr G. B. Nair (Director, NICED, Kolkota)• Selection of Chair and Rapporteur (Dr Jai P. Narain)
1000 – 1030	An overview of climate change and health: challenges and opportunities (Dr A. Sattar Yoosuf)
1030 – 1100	Research priorities in the context of climate change and health (Dr G.B. Nair/Dr A.P. Dash)
1100 – 1120	Introduction to WHO/SEARO research initiatives in climate change and communicable diseases (Dr Jai P. Narain)
1120 – 1300	Retrospective studies on assessing impact of climate change on communicable diseases: introducing the generic research protocols: <ul style="list-style-type: none">– Diarrhoeal diseases (Dr Alok Deb)– Vector-borne diseases (Dr R.C. Dhiman)– Discussion on the protocols
1400 – 1700	Discussion

Tuesday, 25 August 2009:

0900 – 1000	Prospective studies on assessing impact of climate change on communicable diseases: introducing the generic research protocols: <ul style="list-style-type: none">– Diarrhoeal diseases (Dr S. Kanungo)– Vector-borne diseases (Dr R.C. Dhiman)
1030 – 1300	Discussion

1400 – 1500	Discussion
1530 – 1600	Presentation by Dr AKM Siddiqui (ICDDR)
1600 – 1730	Country experiences

Wednesday, 26 August 2009:

0900 – 1030	Preparedness Response (introducing the generic research protocols) <ul style="list-style-type: none">– Diarrhoeal diseases (Dr Anup Palit)– Vector-borne diseases (Dr R.C. Dhiman)– Discussion
1100 – 1300	Discussion and finalization of protocols
1400 – 1530	Discussion and finalization of protocols
1600	<i>The Way Forward...</i>
1630	Closure

Global climate change is expected to have a long-term effect on the ecosystem, thereby increasing the risk of various infectious diseases, specifically diarrhoeal and vector-borne ailments. Global warming is of particular concern as it creates warmer and wetter conditions which are conducive for disease transmission and propagation.

The WHO Regional Office for South-East Asia organized an informal consultation in August 2009 in Kolkata to identify priority areas for research on the impact of climate change on communicable diseases. Generic protocols for research on such impact were reviewed at the consultation.



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