

# Research to Assess Impact of Climate Change on Communicable Diseases

*Report of an Informal Consultation  
WHO/SEARO, 15-17 September 2010*



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# Contents

	<i>Page</i>
Executive summary .....	v
1. Opening session .....	1
2. Objectives .....	3
3. Technical Session: Update on climate change and impact on health .....	3
4. Country presentations.....	4
5. Current research needs.....	6
6. TDR's research on climate change .....	6
7. Experience from India and Nepal.....	6
8. Country interest.....	7
9. Drafting of proposals for retrospective studies on diarrhoeal diseases.....	7
10. Drafting of proposals for retrospective studies on vector-borne diseases .....	8
11. Recommendations.....	9

## Annexes

1. Agenda.....	10
2. List of participants.....	11



## Executive summary

Climate change is known to affect amongst others human health. Climate change can cause floods, drought, earthquakes and landslides, which, in time can affect human health directly or indirectly. Climate change has an impact on vector-borne diseases like malaria, kala-azar, dengue, chikungunya and diarrhoeal diseases including cholera. WHO-SEARO in collaboration with the Indian Council of Medical Research has developed generic guidelines for both retrospective and prospective studies to understand the impact of climate change on communicable diseases. In this consultation, the generic protocols were introduced to the participants of eight SEAR Member States namely, Bangladesh, Bhutan, India, Indonesia, Maldives, Nepal, Sri Lanka and Thailand. All the country participants showed a strong interest in developing protocols to study the impact of climate change on vector-borne or diarrhoeal diseases and submitting them to WHO-SEARO for funding.



## 1. Opening session

Dr Jai P Narain, Director, Communicable Diseases, welcomed the participants and highlighted the objectives of the meeting which was attended by eight SEAR Member States namely; Bangladesh, Bhutan, India, Indonesia, Maldives, Nepal, Sri Lanka and Thailand.

In his message, the Regional Director, Dr Samlee Plianbangchang said that climate change is a threat to global public health. The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change in climate that is attributable directly or indirectly to human activities that alter the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods. Newer and stronger evidence shows that most of the global warming observed over the last 50 years is attributable to various human activities. The effects of climate change are illustrated in many different sectors such as agriculture and food production, availability of fresh water, clean environment and balanced ecology – all of which ultimately affect human health. Thus, it is essential to understand the negative impacts of climate change, both early and long-term, to overcome the impending health hazards.

The Regional Director said that unfortunately, the ill effects of climate change on human health occur disproportionately among underserved populations especially in developing countries. Rapid economic development along with growing urbanization of the poorer countries not only increase their vulnerability to different health hazards but also turn them into increasing contributors to the problem. Catastrophic weather events such as floods, droughts and other natural disasters are bound to increase as a result of changes in climate. “According to an estimate, 3.5 million deaths occur each year solely on account of droughts, which occur periodically in the vulnerable areas. It is likely that future tropical cyclones (typhoons and hurricanes) will become more intense, with larger peak wind speeds and heavier precipitation, along with ongoing increases in the sea surface temperature. Changing temperature and rainfall are certain to alter the geographical distribution of insect vectors associated with diseases in humans, such as malaria, dengue and chikungunya. An increased number of deaths is also expected due to extremes of temperature, which on one hand

will produce heat waves resulting in heat strokes, and on the other hand will produce cold waves resulting in frost bite, hypothermia and shock”, the Regional Director added.

The Regional Director said that “WHO is coordinating and supporting research and assessment on the most effective measures to protect health from climate change, particularly for vulnerable populations such as women and children in developing countries. In 2008, World Health Day focused on the need to protect health from climate change. WHO selected this theme in recognition that climate change poses a growing threat to global public health security.

However, to identify and adopt effective protective measures, it is necessary to have sufficient evidence on patterns of climate change over time and contributing factors, the impact of such changes on human health, and ways to mitigate such impacts. Despite a plethora of information generated over past decades, there still exists a deficiency in clearly understanding the exact nature and magnitude of the climate disease relationships which hinders the policy-makers in taking effective decisions to tackle the problem. This has happened mainly due to lack of uniformity in data collection and analysis procedures, since different studies used different methodologies to assess these relationships. Thus, it has become imperative to develop and use generic multi-country protocols to assess the association between climate change and communicable diseases, especially diarrhoea/cholera and vector-borne diseases, and to identify actions to meet the challenges. The present protocol is an initial effort in this direction, keeping in view the needs of the South-East Asia Region.

This informal consultation on climate change and its negative impact on human health is meant specifically to assess the impacts on vector-borne diseases and diarrhoeal diseases using the generic protocol developed by the WHO Regional Office for South-East Asia. The objective of this consultation is to sensitize scientists and public health specialists to the generic protocol and to identify potential institutions/investigators who may be interested in carrying out such studies. WHO will initially concentrate on using secondary data, which may be easily available, to understand the health impacts of climate change for the identified diseases in the Region. To accomplish this, grants of \$10 000 to \$15 000 will be provided to each institution. We sincerely hope that this endeavour will produce sound evidence that will allow decision-makers to develop and adopt more

effective and efficient policies to mitigate this important public health problem”, the Regional Director added.

During the inaugural session, Dr Sattar said that there are a number of social determinants of climate-related health problems that also need to be addressed. He acknowledged that this will surely make modeling difficult but also emphasized that efforts should be made to capture such information.

## **2. Objectives**

### **General objective**

The main objective was to introduce and discuss with the Member States the two generic protocols (for retrospective and prospective studies) to assess the impact of climate change on diarrhoeal and vector-borne diseases. (These protocols were developed by SEARO in collaboration with the National Institute of Cholera & Enteric Diseases (NICED), Kolkata and the National Institute of Malaria Research (NIMR), New Delhi.

### **Specific objective:**

- (1) It was expected that the discussions would generate sufficient interest among the participating countries for conducting retrospective studies using the generic protocol.
- (2) The final objective was to enable the countries in preparation and submission of research proposals for retrospective studies to WHO-SEARO.

## **3. Technical Session: Update on climate change and impact on health**

Ms Payden, Regional Adviser, WHO-SEARO and Dr Dipika Sur, NICED, Kolkata, presented an overview of climate change and human health. Ms Payden elaborated on the sources of the greenhouse gases (GHG) which were mostly manmade. She emphasized that although most GHG are

emitted by the industrialized countries, the adverse health consequences are faced mostly by the poorer countries who are not well equipped to assess and mitigate their impact. Dr Sur highlighted the health impact of climate change including communicable and non communicable diseases. She also elaborated possible measures to reduce the factors responsible for climate change like deforestation, burning of fossil fuel, population explosion etc. Dr. Sur also mentioned that diarrhoeal diseases, especially cholera, are sensitive markers for monitoring the impact of climate change.

Mr Gerardo Sanchez presented policies and strategies for reducing climate change. He highlighted the public health impacts of extremes of temperature, floods, storms, landslides, cyclones and drought. He explained that the projected health impacts of climate change are mostly negative, quite substantial and unequally distributed. He also spoke about projected climate change-induced impacts of selective communicable and non communicable diseases. Dr Gerardo expressed his concerns about the status quo of international climate policy regarding health; although WHO's stance is quite assertive, it needs to widen its focus. At the same time, he spoke about strategies for health adaptation to climate change including strengthening of health systems for assessing vulnerability of health from climate change. Dr Gerardo also underscored the need for focusing on global research priorities to protect health from climate change including risk assessment and improving support for decision-making.

## **4. Country presentations**

Each country representative briefly narrated their experiences and presented specific actions taken to reduce the negative impacts of climate change.

**Bangladesh:** Dr Mohammad Karim presented the country situation and said that previously Bangladesh had six distinct seasons which had come down to four. Severe malaria cases are on the rise and dengue which was not present before 2001 is being observed now. Another serious health problem is contamination of ground water with arsenic. Actions taken by the government regarding climate change include setting up of a Climate Change and Health Promotion Unit since 2009. There is a national steering committee on health and telemedicine.

**India:** Dr Dhiman stated that with the Prime Minister's initiative, the Indian government had developed a National Action Plan for Climate

Change (NAPCC) in 2008. A task force was established by the Ministry of Health, National Communication (NATCOM) project, by the Ministry of Environment (since 2002), and Indian Network of Climate Change Assessment (INCCA), since 2009, are in place. A State Action Plan for Climate Change (SAPCC) is in the offing. Work is going on to provide evidence-based data on biophysical determinants of malaria. The country is experiencing an increased number of disasters and witnessing the emergence of new vectors.

**Maldives:** Dr J. Mohamed spoke on the main issues of concern in his country with regard to vector-borne diseases and diarrhoea. Dengue and chikungunya are already rampant in the country but more alarming is the fact that scrub typhus has re-emerged and although the country has been malaria-free since 1984, there is an increased risk of re-emergence of the disease. The President of Maldives has taken steps for introducing mechanisms for renewable energy and has claimed that the country would be carbon neutral by 2019. A Presidential Advisory Committee on Climate Change has been established along with a National Adaptation Plan of Action (NAPA). The country proposes to develop a pilot project on “Healthy Climate Resilience in Islands of Maldives”. A Green Health Sector has been set-up towards action for NAPA III. Several areas like water, energy, transport and waste have been identified to reduce environmental footprints.

**Nepal:** Steps taken by the government to reduce greenhouse effects include an inventory of good practices and entomological survey. Eleven thematic groups on climate change have been established with the Ministry of Environment. NAPA, LAPA (Local Adaptation Plan of Action), and Strategic Plan on Climate Resilience (SPCR) already in existence. Recently, there has been an emergence of new dengue vectors and also an increase in cholera outbreaks since 2009.

**Sri Lanka:** The representative from Sri Lanka expressed concern that dengue which used to peak in July is now occurring in February also. A National Environment Act has been in place since 2003, which sends out alerts during floods and landslides and also undertakes environmental forecasting and active surveillance. A National Dengue Co-ordination Unit has been established since 2004 as well as a Disaster Management Co-ordination Centre (DMCC) under the Ministry of Health and the Presidential Task Force.

**Thailand:** The representative from Thailand commented that in their country they have noticed that for each 1°C rise in temperature, dengue cases increasing by 10%.

## **5. Current research needs**

Dr Sujit K. Bhattacharya presented current research needs in the area of climate change and communicable diseases. He mentioned that the dynamic interactions between humans and climate are not new, but the scale of such interactions has reached unprecedented proportions. Main research needs should focus on estimating the trends of climate-sensitive diseases, identifying proper adaptation and mitigation techniques, and assessing and ensuring preparedness of the public health system. Dr Bhattacharya also mentioned the main future tasks for climate researchers. He emphasized that the newly developed generic protocols on retrospective and prospective studies on climate change and diarrhoea and vector-borne diseases will certainly help to steer future research efforts.

## **6. TDR's research on climate change**

Dr Yeya Toure made a presentation on TDR's ongoing research on climate change and health. He gave an overview of TDR's research and capacity building activities and its response to the challenge of assessing impact of climate and environmental change on health. He also spoke on the workplan for a TDR research on effects of climate and environmental change on vectors and vector-borne diseases (2012-2018).

## **7. Experience from India and Nepal**

Dr Alok Kumar Deb, introduced the retrospective protocol to the participants. He also presented the findings as well as issues identified during implementation of this protocol on a pilot basis in Kolkata. Dr Gajanand Bhandari from Nepal also discussed the results and various issues generated during pilot studies for both diarrhoea and vector-borne diseases using the same retrospective protocol in their country. Both Drs. Deb and Bhandari expressed their concerns about lack of expertise in

proper time series analysis in some of the country settings in the Region and urged WHO-SEARO to help the countries in building sufficient capacity in this regard.

Dr R.C. Dhiman presented the generic protocol for prospective studies on climate change and vector-borne diseases. He illustrated different scenarios and available models to assess the climatic impacts on these diseases. He particularly emphasized the PRECIS model for this purpose while demonstrating its usefulness. He believed that perhaps the same could be used by many other countries in the Region as well.

## **8. Country interest**

As anticipated, the above discussions and presentations generated much interest among all participating countries to conduct retrospective studies as per the generic protocols discussed earlier. This led to formulation of draft proposals by the countries in their area(s) of interest with guidance from a coordinator. These are summarized below:

## **9. Drafting of proposals for retrospective studies on diarrhoeal diseases**

Participants:

- Dr Alok Kumar Deb (Coordinator)
- Dr Ichhpujani
- Mr Sonam Chophel
- Mr Khampa Tshering
- Dr Dipika Sur
- Dr Nitish Dogra
- Dr Cicilia Windianingsih
- Dr Dadang Hilman
- Dr Gajananda Prakash Bhandari

- Dr Sambhu Kafle

## 10. Drafting of proposals for retrospective studies on vector-borne diseases

Participants:

- Dr R C Dhiman (Coordinator)
- Ms Sneha Balakrishnan
- Dr Supratman Sukawati
- Dr Ahmed J Mohamed
- Dr KLNSK De Alwis
- Prof. A Pathmeswaran
- Prof. Rohini Seneviratna
- Ms Jiraporn Sevana
- Prof P Kittayapong
- Dr Mohammad J Karim

**Feedback** on country-specific protocols were given by the participants of each country as follows:

Bangladesh	:	Malaria
Bhutan	:	Diarrhoeal diseases
India	:	Vector-borne diseases
	:	Diarrhoeal diseases
	:	Malaria
Indonesia	:	Diarrhoeal diseases and dengue
Maldives	:	Diarrhoeal diseases and vector-borne diseases
Nepal	:	Diarrhoeal diseases
Sri Lanka	:	Dengue
Thailand	:	Dengue

**Outcome:** It was proposed that, based upon the feedbacks received from the attendees for each of the draft proposals, the respective members

will finalize their proposals after returning to their countries within a week and send them to WHO-SEARO for evaluation and decision about possible funding.

The meeting ended with encouraging and concluding remarks from Dr Chusak and a vote of thanks by Dr Bhattacharya.

## **11. Recommendations**

All the eight participating countries in the meeting expressed their willingness and commitment to submit proposals for retrospective studies to assess the impact of climate change on diarrhoeal or vector-borne diseases.

- Bhutan, India, Indonesia, Maldives and Nepal showed interest to submit proposals on diarrhoeal diseases and climate change.
- Bangladesh, Indonesia, India, Maldives, Sri Lanka and Thailand were interested to put up proposals on vector-borne diseases and climate change.

It was recommended that there is a need for:

- Training for all principal investigators to maintain uniformity in project formulation and execution.
- Training is also required for basic time series analysis for statistical analysis of the data by the principal investigators themselves.

Non-climatic factors which could act as effect modifiers of the outcome must be identified and taken into consideration when developing the protocol.

## **Annex 1**

### **Agenda**

- Registration
- Opening session
- General presentation on climate change and its impact
- Presentation on impact of climate change on human health
- Country presentation on best practices on mitigation and adaptation
- Introduction of generic protocols (retrospective and prospective) for vector-borne and diarrhoeal diseases
- Development of protocols using the generic protocol
- Conclusion and recommendations
- Closing

## Annex 2

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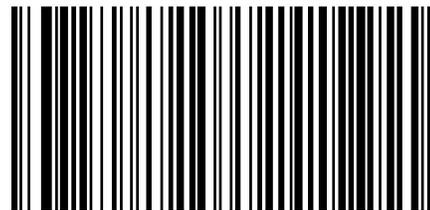
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Climate change is known to affect, amongst others, human health. An informal consultation was held to introduce and discuss with experts from Member States two generic protocols (for retrospective and prospective studies) to assess the impact of climate change on diarrhoeal and vector-borne diseases. This led to the formulation of draft proposals by the experts. Once the proposals are finalized after peer review, it is planned to fund them. This approach will provide useful information on the subject and also help in capacity building.



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