

Climate Change and Health

Policy options for climate change and health

Report on a joint WHO-PBL technical meeting

Bonn, Germany

11-12 January, 2010

ABSTRACT

Scientific experts in wide areas of climate change and human health response and representatives from the European Commission (EC), European Agencies and other international partners met to discuss and assess policy options for effective health adaptation to climate change. This was organized within the context of the jointly-funded WHO-EC "Climate, Environment and Health Action Plan and Information System" (CEHAPIS) project, and the Netherlands Environmental Assessment Agency (PBL) study on adaptation strategies for a climate-proof Netherlands. The WHO Regional Office for Europe and the Netherlands Environmental Assessment Agency are working together to identify and prioritize policy options, and to assess expert opinion on adaptation policy choices.

Keywords

CLIMATE CHANGE
PUBLIC HEALTH
HEALTH POLICY
HEALTH SYSTEMS PLANS
RISK ASSESSMENT
RISK MANAGEMENT
HEALTH STATUS
INFORMATION SYSTEMS

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LIST OF ABBREVIATIONS

AR	awareness raising
CC	climate change
CEHAPIS	Climate, Environment and Health Action Plan, and Information System
CSWD	European Commission Staff Working Document
EC	European Commission
GP	general practitioner
HiAP	health in all policies
HS	health systems
IPCC	Intergovernmental Panel on Climate Change
MS	Member State(s)
PBL	Planbureau voor de Leefomgeving (Netherlands Environmental Assessment Agency)
PESETA	Projection of Economic impacts of climate change in Sectors of the European Union based on bottom-up Analysis
PH	public health
RIS	Research, Information Systems, Methods and Tools
RIVM	Rijksinstituut voor Volksgezondheid en Milieu (National Institute for Public Health and the Environment of the Netherlands)
UNFCCC	United Nations Framework Convention on Climate Change
VROM	Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer (Ministry of Housing, Spatial Planning and the Environment of the Netherlands)
WHO	World Health Organization

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This report summarizes the discussion on assessing policy options for effective health adaptation to climate change, organized within the context of the “Climate, Environment and Health Action Plan and Information System” (CEHAPIS) project, and the Netherlands Environmental Assessment Agency (PBL) study on adaptation strategies for a climate-proof Netherlands. This meeting was financially supported by WHO, the European Commission Directorate-General for Health and Consumers (DG SANCO) and the Netherlands Environmental Assessment Agency (PBL).

INTRODUCTION

Over recent years it has become clear that warming of the climate system is unequivocal. Climate change has already affected human health. The issue now is not whether climate change is occurring, but how we can respond most effectively.

Tackling the root causes of climate change and understanding the health co-benefits of action, investing into healthy environments, and advocating for healthy developments are of great potential for reducing the burden of disease and promoting population health. The first steps are clear. In the short term, strengthening health systems, and proven, cheap effective public health interventions to control climate-sensitive diseases, will reduce vulnerability to climate change. However large uncertainties still remain and in particular affect government decisions on policy priorities and effective action in the future years to come. Therefore, the WHO Regional Office for Europe and the European Commission established the “Climate, Environment and Health Action Plan and Information System” (CEHAPIS) project to: i) identify the current and future health risks of climate change for the European Region; ii) identify policy options; iii) to provide an evaluation of their impacts for successful health adaptation to climate change; and iv) monitor trends and policies over time.

In addition, the Netherlands Environmental Assessment Agency (PBL) is developing a roadmap to a climate-proof Netherlands, including adaptation options and adaptation strategies to reduce the health impact of climate change.

The WHO Regional Office for Europe identified through the task force on climate change and health a number of policy options. Together with the Netherlands Environmental Assessment Agency it then worked together to assess expert opinion on adaptation policy choices. For this purpose, the WHO Regional Office for Europe and the Netherlands Environmental Assessment Agency co-organized a two-day meeting at the United Nations campus in Bonn discussing “Policy options for climate change and health”.

The aims of the expert meeting in Bonn were to:

- discuss and assess policy options for effective health adaptation to climate change;
- discuss how these policy options and response measures can be assessed in accordance with an EU impact assessment;
- discuss criteria for weighing and appraisal of policy options;
- identify priorities for adaptation action under uncertainties.

The meeting was attended by scientific experts from wide areas of climate change and human health response, representatives from the European Commission and European Agencies, and other international partners. The full list of attending participants is provided in the annex.

CLIMATE CHANGE, HEALTH AND UNCERTAINTIES

Within the scope of the current work of the WHO Regional Office for Europe and PBL, both organizations are undertaking thorough analyses of the impacts of climate change on public health in Europe. In particular, there are two key projects underway in this field, and these are outlined below. Moreover, the findings of two assessment studies on climate change, health and uncertainty were presented. In the discussion during the meeting it was agreed to consider the time horizon of maximum 2030/2050. Many of the policy choices will be done under a high

level of uncertainty. Therefore incremental adaptation strategies need to be developed. The term ‘incremental’ in policy development refers to a process of connected building blocks of actions, eventually resulting in policy change. In addition, there is a need for increased attention to the vulnerability of disadvantaged population groups for health impacts of climate change and the cumulative effects of several climate-related exposure factors.

Protecting health in Europe from climate change: policy options for climate change and health

Bettina Menne, WHO Regional Office for Europe

The “Climate, Environment and Health Action Plan and Information System” (CEHAPIS) project is a jointly-funded project established and by the WHO Regional Office for Europe and the European Commission. The overall aim of the project is to provide an evaluation of policy options for a successful health adaptation to climate change and monitor trends over time. This includes preparing an assessment of the consequences of climate change on public health in Europe. Towards this objective, the WHO prepared a technical background document on the public health impacts of climate change, as well as a discussion document on policy options for adaptation and mitigation. The policy options are presented in four key categories: (i) ensuring that all current and future climate change mitigation and adaptation measures, policies and strategies include health issues at all levels; (ii) strengthening public health and health services to improve their capacity to prevent, prepare, and cope with climate change; (iii) raising awareness to encourage health mitigation and adaptation policies in all sectors; and (iv) sharing of best practices, tools, data and information, and enhancing research.

Roadmap to a climate-proof Netherlands – adaptation to health effects

Leendert van Bree, Netherlands Environmental Assessment Agency (PBL)

Trends in climate change are expected to continue, although there is uncertainty about the rate and the possible impact. Possible consequences such as the increasing temperature and the frequency and intensity of weather extremes, increasing river discharges, and sea level rise may have a substantial negative impact on a country like the Netherlands and require a targeted long-term adaptation strategy lowering the country’s vulnerability. The adaptive ability of the Netherlands is, however, influenced by (choices in) spatial and non-spatial developments and the political and societal willingness to adapt. The Dutch Ministry of Housing, Spatial Planning and the Environment (Ministerie van VROM) has therefore requested the Netherlands Environmental Assessment Agency (PBL) to develop a roadmap for a climate-proof Netherlands. (1) The PBL roadmap study is conducted using a structured, stepwise framework to develop adaptation strategies. The framework consists of the following critical elements: (i) potential impacts, (ii) possible adaptation options, (iii) relevant criteria to judge adaptation options, (iv) selection of relevant adaptation options, (v) possible governance mechanisms, and (vi) targeted adaptation strategies. Besides strategic themes like ‘agriculture and nature’ and ‘water safety’, the PBL roadmap study also focuses on urban resilience and on health. The central aim of the PBL study is to develop targeted adaptation strategies and to search for co-benefits with existing and new urban and rural spatial policies.

Climate and health impact assessment

Franziska Matthies, WHO Regional Office for Europe

The preliminary assessment carried out by the WHO and several other agencies point out that impacts of climate change are already being observed in Europe; heat-waves, floods, and droughts are all increasing in their frequency and intensity. Health effects have already been observed, in particular from heat-waves and associated air pollution, as well as changes in the range of disease vectors (2) Very few future projections of health effects are available. Those available mainly point out to an increased heat-wave risk, flooding risk and the re-emergence of some vector borne diseases in Europe. It is also important to note that climate change will affect everybody, but not everybody in the same way: populations differ in their vulnerability. In particular, as developing and long-term exposed organisms, children are most at risk, and excessive heat primarily affects old people. During extreme weather events emergency services providers and labourers in outdoor environments are especially affected. A recent Lancet assessment pointed out the benefits for human health in reducing greenhouse gas emissions: (i) air pollution, namely particulate matter and ozone, is reduced, thus improving urban air quality; (ii) sustainable transport schemes can reduce traffic-related injuries and increase physical activity and thus contribute to reduce obesity and cardio vascular diseases; (iii) changes in agricultural sector, especially livestock farming, could be a response to consumers’ climate-friendly diet; and (iv) reduction in carbon dioxide emissions in building and construction could lead to health benefits in indoor air quality. The details of the impact assessment are presented in the WHO technical background document.

Expert survey on climate change, health and uncertainties

Arjan Wardekker, Utrecht University

Impact assessments of climate change entail numerous uncertainties. Health risk estimates can be made with various levels of precision. Regarding some of the impacts we may be effectively ignorant, while for others, we

may be able to give rough indications or quantitative estimates of the risk. Experts in a Dutch survey indicated that, for most health effects, we can indicate the direction of change; whether there will be a positive or negative impact. For several suggested impacts, changes are plausible, but the trend may be ambiguous. Examples include allergic disorders, flood-related contaminants, and epidemics of non-endemic vector-borne diseases. For several other effects, it may be possible to give rough quantitative estimates; mainly in terms of the expected 'order of magnitude' of the health risk. Examples include temperature-related mortality and contamination of bathing water. Heat-related mortality and non-endemic vector-borne diseases are particularly relevant for Dutch climate adaptation. Differences in the level of precision and relevance for adaptation can lead to different policy strategies. For health risks with high precision and high relevance, tailored prediction-based strategies, with costly and extensive/encroaching options may be feasible. If precision and relevance are low, it may be more appropriate to focus on enhancing the capability of current measures, dealing with changes and surprises, using options with low costs or high co-benefits.

CLIMATE CHANGE, HEALTH AND ADAPTATION POLICY

Policy options for strengthening public health measures and novel policy approaches with respect to climate change impacts in Europe

James Creswick, WHO Regional Office for Europe

Within the scope of the CEHAPIS project, the WHO is developing policy proposals and associated policy assessment for the European Commission on climate change and health. These policies will work towards implementing the European Commission White Paper on adapting to climate change, (3) as well as the European Regional Framework for Action (4) adopted at the 5th Ministerial Conference on Environment and Health in Parma on 10-12 March, 2010. The methodology on how to carry out the impact assessment is being developed within the Impact Assessment Guidelines of the European Commission. (5) There is a substantial legal basis for action, taking into account Articles 168 & 191 of the Treaty on the Functioning of the European Union, (6) Article 1 of the United Nations Framework Convention on Climate Change, (7) resolutions of the 61st World Health Assembly, and decisions of 124th session of WHO Executive Board. The document under development by the WHO aims at: (i) assessing policy options for effective health adaptation; (ii) identifying direct and indirect environmental, economic and social (including health) impacts and how they occur; (iii) identifying who is affected by these impacts (including those outside the EU) and in what way; (iv) identifying whether there are specific impacts that should be examined; (v) assessing the impacts in qualitative, quantitative and monetary terms or explain why quantification is not possible or proportionate; and (vi) considering the risks and uncertainties in the policy choices.

Introduction to the group exercise on “uncertainty-robust” adaptation strategies

Eva Kunseler, Netherlands Environmental Assessment Agency (PBL)

Leendert van Bree, Netherlands Environmental Assessment Agency (PBL)

Bettina Menne, WHO Regional Office for Europe

Jeroen van der Sluijs, Utrecht University

The policies to be assessed were identified by the European Climate Change and Health Task Force¹ and divided into four overall strategies, and the participants were split into four groups according to these four strategies:

- Group 1: Promote health in all policies
- Group 2: Strengthen health systems
- Group 3: Raising awareness
- Group 4: Strengthen research, information systems, methods and tools

Each set of policy options was divided in addition into one of three categories:

- A: Capacity-building options, addressing enabling mechanisms for adaptation, functioning as preconditions for other types of policy action on adaptation for health impacts of climate change;
- B: Instrumental options, representing mechanisms for adaptation such as regulation, guidance, incentives etc., addressing health directly or indirectly e.g. through enhancing adaptation capacity;
- C: Health-specific options, addressing the exposure or potential health effects of climate change.

¹ The European Climate Change and Health Task Force was chaired by the United Kingdom and Serbia, with the participation of Belgium, the Czech Republic, Denmark, Finland, Germany, Hungary, Italy, the Netherlands, the European Commission, the European Environment Agency, the European Centre for Disease Prevention and Control, the Health and Environment Alliance, the Regional Environment Centre and the World Health Organization (WHO) Regional Office for Europe. The Task Force was open for participation to all Member States and agencies in the WHO European Region. The WHO Regional Office for Europe acted as the secretariat for the Task Force.

All the policy options were presented in the WHO discussion background document. In the four parallel groups the policy options were discussed and suggestions were formulated for adjustments and revisions, as can be seen in the following sections. Subsequently, the groups each selected six options from their table for analysis based on the argument of maximizing potential impact, particularly in terms of health gain. Moreover, this offered the opportunity for discussion on the inter-relatedness of options. This selection process was to enable an in-depth discussion of a few key options, due to time-constraints.

For the six selected options, the participants individually completed scoring cards (please see Annex I for explanation of the criteria and Annex II for an example score card), one for each option, following a list of criteria. The criteria addressed:

- the impact of the option including health gain, economic impact, social impact, environmental impact, encroachment, indirect effects and synergies/conflicts;
- the approach and usefulness under uncertainty addressing resistance, resilience, adaptive capacity, robustness, and flexibility;
- other relevant aspects including span/specificity, public support, equity, urgency, implementation time, spatial and institutional scale, and control type.

The criteria were developed by Utrecht University and PBL and relate to key elements of adaptation options, which were further developed from the Utrecht University report on uncertainty and climate change adaptation. (8)

The revised set of policy options and related discussion on the selection and results of the scoring of the options for each group are summarized separately.

Group 1: Health in all policies

The group interpreted the health in all policies strategy in relation to climate change as follows: ‘Health in all policies is to ensure that all mitigation and adaptation measures include the assessment of possible health effects.’ The concept of health is interpreted according to the Constitution of the World Health Organization.² As the time scale of the options varies considerably, the group suggested dividing the options into short, medium, and long-term options.

Table 1: “Health in all policies” policy options

Health in all policies	
<i>Suggested list of options</i>	<i>Notes</i>
A: Capacity-building	
1. Make available toolboxes for health impact assessment of climate change related GHG reduction measures, policies and technologies by 2014;	Requires a holistic and integrated approach
2. Create a database on health impacts of climate change related mitigation and adaptation policies, measures and strategies by 2014;	
3. Develop regular regional assessment and, if appropriate, sub-regional assessments on the health implications of climate change related mitigation and adaptation measures;	
4. Incorporate the health professional perspective in decision making on climate change on national and local level.	The term participation is too narrow: Involvement of public health professionals in the climate change discussion on the potential health effects of climate change pre-conditionally requires capacity building, awareness raising, training, information (e.g. Lancet series) among the health community. Being well-informed the PH community can accordingly add valuable context to the discussion.
5. Establish a multi-sectoral committee that assesses, and through recommendations ensures that any new related legislation, policies and technologies properly address human health and climate change, by 2011	It is important to additionally address the institutional structure of the committee, e.g. organized in the office of the prime minister.
B: Instrumental	
1. Include climate change into health impact assessment;	New option added
C: Health-specific	
1. Revision of building codes to ensure healthy energy efficient buildings	
2. Climate adaptive urban planning such as greening, water, parks,	

² “Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.” Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April, 1948.

wind corridors, to consider health risks such as allergies and certain infectious diseases.	
3. Encourage lowering production and consumption of food of animal origin	A broader term should be used: food of animal origin. Awareness and incentives need to target both producer and consumer
4. Integrated water management: quality management on re-use of waste water and the distribution of drinking water.	Water management covers both drinking water and waste water.
5. Lower carbon intensive traffic and active promotion of cycling and walking	
6. Revisions of the return period and severity codes of extreme events	
7. Climate proof infrastructure under climate change	A climate proof infrastructure holds two meanings: a climate/disaster proof health infrastructure (hospitals etc) and an infrastructure that is climate proof expressed in terms of health risk reduction (flooding etc)
8. Control and reduction of volatile oxygen compounds;	New option added
9. Control and reduction of pesticides in countries where food production is under pressure of climate change	New option added

The group discussed which six policy options to choose and agreed that the set of selected options was not necessarily the set with the highest expected health impact or highest cost-effectiveness, but agreed that selection criteria included, that the:

- Option needs to be reasonably suited for scoring;
- Option is lively discussed resulting in a collective unambiguous interpretation;
- Option is understood with a clear and unambiguous definition

The group selected the following options for analysis:

- A2: Create a database on health impacts of climate change related mitigation and adaptation policies, measures and strategies by 2014;
- A4: Incorporate the health professional perspective in decision making on climate change on national and local level;
- B1: Include climate change into health impact assessment;
- C2: Climate adaptive urban planning such as greening, water, parks, wind corridors, to consider health risks such as allergies and certain infectious diseases;
- C3: Encourage lowering production and consumption of food of animal origin;
- C4: Integrated water management: quality management on re-use of waste water and the distribution of drinking water.

The group's argument for selection of A2 were that it can be realised with relatively few means, and the gains in terms of knowledge on health gains outweighs the costs. For B1, the group reasoned that health impact assessment is the instrument to picture health effects and enforce legislative arrangements. C4 has high health co-benefits, but a distinction in country or local perspective would result in different scores.

The distinction in capacity-building, instrumental and health specific types of options caused considerable confusion since the three categories were not clearly understood. Moreover, the options that can be implemented in a cost-effective manner are principally those of a more general character, resulting in health co-benefits. It is suggested to add to the list a category of policy options on implementation strategies.

A table summarising the result of the discussion and assessment of the group can be seen below. The results were of the scoring were given a quantitative value and the colour-coding is based upon the median score; the arguments for the scores are summarized and included in the score boxes.

Table 2: Scores and arguments of the adaptation options under theme 'health in all policies'

Legend: **Highly positive;** **Positive;** **In between positive and negative;** **Negative;** **Very negative**

Options →	HiAP A2: Create a database on health impacts of climate change related mitigation and adaptation policies, measures and strategies by 2014	HiAP A4: Incorporate the health professional perspective in decision making on climate change on national and local level	HiAP B1: Include climate change into health impact assessment	HiAP C2: Climate adaptive urban planning such as greening, water, parks, wind corridors, to consider health risks such as allergies and certain infectious diseases	HiAP C3: Encourage lowering production and consumption of food of animal origin	HiAP C4: Integrated water management: quality management on re-use of waste water and the distribution of drinking water
Criteria ↓						

Impacts: What are the potential impacts (health, social) of the adaptation option?	High impact: Database enables for awareness on links of CC and health, best practice information and comparison	High impact: The statement of health professionals can have essential impact, especially at local/ regional level	Very high potential	High impact: if the measures are appropriately chosen	High impact: if the measures are obligatory	High impact: Lowering the risk of infectious diseases
Costs: What are the efforts (costs) of the adaptation option?	Slightly costly: It is costly to develop, fill and maintain the database; One central agency should collect the data	Hardly costly	Slightly costly: if the measures are taken into consideration	Moderately costly: Urban changes require investments	Moderately costly: Meat industry will be highly affected	Moderately costly
Encroachment: How deeply does the adaptation option encroach on society and the health system?	Not encroaching: a database is merely for collection of information on mechanisms and planned actions; Hardly any societal or health system impact	Moderately encroaching: It affects the health system, particularly when it becomes an obligation or formalised process	Moderately encroaching: Regulation needs to be implemented in order for the option to be successful	Moderately encroaching: The option requires new regulations, decision tools and financial structures	Deeply encroaching: because it causes a system change	Moderately encroaching: Large impact on infrastructure
Co-benefits: What are the indirect effects and synergies / conflicts of the adaptation option?	Neutral: Data gathering may be useful to many different purposes	Positive: Possibly beneficial to other areas; neutral to mitigation	Positive effects; neutral to mitigation	Highly positive: The option addresses many sectors	Highly positive: synergistic with environmental sector and mitigation policy on meat production, manure and transport	Positive for environmental sector; neutral to mitigation
Robustness: Can the adaptation option can withstand a wide range of possible future climates?	Highly robust	Highly robust, it is a human resource issue	Very highly robust	Moderately robust: Urban planning requires changes in building and transport infrastructure	Very highly robust	Very highly robust
Flexibility: Can the option be easily modified should reality turn out different than expected?	Highly flexible	Highly flexible, depending on the professionals	Highly flexible	Highly flexible	Moderately flexible: It affects societal consumption patterns	Moderately flexible
No regret: What are the consequences if the option does not have the desired effect of if effects of CC turn out to be not what was expected?	Minor consequences	Moderate consequences: alternative options are available	Moderate consequences: depending on the assessment topic	Moderate consequences: principally investment-related	Moderate consequences: healthier diets and improved animal treatment are no regret	Minor consequences

All the options were assessed as presenting a high or very high impact. With the exception of the database creation (A2), which was considered non-encroaching, all other assessed options are moderately to deeply encroaching on society and health systems. The co-benefits, robustness, and flexibility are all generally positive, and the policies also satisfy the “no-regret” concept.

Group 2: Health systems

The policy options for the strengthening of health systems are outlined in the table 3.

Table 3: “Health systems” policy options

Health systems
A: Capacity-building
1. Integrate health assessments into other sectors and promote healthy policy implications;
2. Promote resilience to climate change within all sectors including health sector through all instruments now and in the future (regulatory, technical etc e.g. make health impact assessment mandatory);
3. Expand current legislation allowing the freedom of movement of patients and health professionals and transferability of professional qualifications of health professionals;

4. To expand the current Environment and health information systems to a climate environment and health information system, analyzing trends over time and policy effectiveness;
B: Instrumental
1. Develop and implement national adaptation action plans based on collection of baseline health and other relevant data;
2. Develop and implement consistent international early-warning and alarm systems to enhance information availability with rapid response on health-related climate situations (e.g. heat, smog, allergens) and identification of vulnerable population groups in particular;
3. Improve diagnostics and availability of medical treatment for health impacts of climate change (e.g. heat, allergies, infectious disease);
4. Develop and implement plans and procedures for outbreak, episodic and emergency preparedness (e.g. heat wave, disease outbreak, flooding) and prevent unnecessary building in flood plains, education & awareness and of town planning
C: Health-specific
1. Enlarge and harmonize the current reporting and surveillance mechanisms on infectious and non-infectious diseases and other threats to health to include potential new and re-emerging diseases in Europe
2. Funding for surveillance of infectious and non-infectious diseases, eradication and emergency vaccination where relevant
3. Develop a catalogue on healthy, energy-efficient behaviours in hospitals and health care facilities, provide criteria for effectiveness and evaluation
4. Harmonize and implement international and national guidance on holistic all hazards preparedness and responses including extreme weather events
5. Implement the WHO global safer hospital programme

The group selected the following options for analysis:

- A1: Integrate health assessments into other sectors and promote healthy policy implications;
- A2: Promote resilience to climate change within all sectors including health sector through all instruments now and in the future (regulatory, technical etc e.g. make health impact assessment mandatory);
- B1: Develop and implement national adaptation action plans based on collection of baseline health and other relevant data;
- B2: Develop and implement consistent international early-warning and alarm systems to enhance information availability with rapid response on health-related climate situations (e.g. heat, smog, allergens) and identification of vulnerable population groups in particular;
- C1: Enlarge and harmonize the current reporting and surveillance mechanisms on infectious and non-infectious diseases and other threats to health to include potential new and re-emerging diseases in Europe;
- C4: Harmonize and implement international and national holistic guidance on all hazards preparedness.

A table summarising the result of the discussion and assessment of the group can be seen below. The colour codes are based upon the median score; the arguments for the scores are summarized and included in the score boxes.

Table 4: Scores and arguments of the adaptation options under theme ‘Health systems’

Legend: **Highly positive**; Positive; In between positive and negative; Negative; **Very negative**

Options →	HS-A1: Integrate health assessments into other sectors and promote healthy policy implications	HS-A2: Promote resilience to climate change within all sectors including health sector through all instruments now and in the future (regulatory, technical etc e.g. make health impact assessment mandatory);	HS-B1: Develop and implement national adaptation action plans based on collection of baseline health and other relevant data	HS-B2: Develop and implement consistent international early-warning and alarm systems to enhance information availability with rapid response on health-related climate situations (e.g. heat, smog, allergens) and identification of vulnerable population groups in particular	HS-C1: Enlarge and harmonize the current reporting and surveillance mechanisms on infectious and non-infectious diseases and other threats to health to include potential new and re-emerging diseases in Europe	HS-C4: Harmonize and implement international and national holistic guidance on all hazards preparedness
Criteria ↓						
Impacts: What are the potential impacts (health, social) of the	Very high impact: This option improves understanding; May change peoples’ behaviour to	High impact: This option increases the regulatory burden for new legislation; a clear protocol is needed for how this	Very high impact: Understanding of health population status will increase; Vulnerable groups can be identified;	Very high impact: Early identification of health impacts enables for rapid treatment; also highly useful for	High impact: Networks could reveal different transmission patterns and help to prevent disease; Emerging	High impact: Holistic approach harmonises same set of actions/responses within EU and allows preparedness;

adaptation option?	healthier lifestyles; Only indirect effects; Not clearly measurable;	should be done.	Potential health risks can proactively be prevented; However, adaptation would otherwise occur autonomously later on	vulnerable groups; Early warning improves ability to intervene for public safety reasons.	diseases can be challenging and timely response can have substantial gain; Evidence for improved advice and management	Stimulates knowledge-transfer across countries; Each EU citizen knows what it can expect
Costs: What are the efforts (costs) of the adaptation option?	Slightly costly: Promotion of health policies can be costly	Moderately costly: Takes time and resources (e.g. training)	Moderately costly: Data system should be established through collaboration networks	Slightly costly: It requires long term and comprehensive monitoring; Existing systems can be used and improved	Moderately costly: Depends on features of current systems, costly if new systems need to be established	Slightly costly: It needs important modifications, but depends on the country and their level of preparedness; Requires implementation on all levels
Encroachment: How deeply does the adaptation option encroach on society and the health system?	Moderately encroaching: Requires changes in institutions and administrative cultures	Deeply encroaching: Needs reforms to modify laws, practices, rules/ affects many sectors and requires change in culture/ mentality	Moderately encroaching: If data collection can fit in to professional routine action (e.g. filled in patient medical file). The option changes the way hazards are dealt with	Moderately encroaching: If system fits in to professional routine action it does not require major reforms	Moderately encroaching: At the moment surveillance networks are not connected, reform is needed but implementation is not very complex	Moderately encroaching: International harmonization is always complicated and costly
Co-benefits: What are the indirect effects and synergies / conflicts of the adaptation option?	Very positive: Can be in conflict with economic interests; aids policies to reduce GHG and potential for positive impacts on transport and environment	Very positive: Gains in other fields because of the mandatory implementation	Positive: Takes adaptation for health into the wider policy domain and shows how adaptation can help with good design & planning	Positive: It relates to environmental policies and civil protection and connects to water and food sectors. Early warning may lead to reduction of GHG due to reduction of traffic	Positive: The option requires integration across sectors	Positive: It improves communication; Less economic damage from extreme events; Synergy with civil protection; May have spin offs to mitigation
Robustness: Can the adaptation option can withstand a wide range of possible future climates?	Very highly robust: Easily adaptable to any particular climate-evolution	Highly robust: depending on mechanism and accuracy	Moderately robust: If data collection is not too specific	Highly robust: System is important and effective to a broad range of climate conditions, irrespective of specific climate scenarios	Very highly robust: If well maintained with proper attribution	Highly robust: The guidance may be overruled by climate events; Should reflect range of climates
Flexibility: Can the option be easily modified should reality turn out different than expected?	Very highly flexible: Can readily be adapted to different scenarios	Moderately flexible	Moderately flexible: Only flexible to certain extent, since data are rather static and infrastructural changes are required	Highly flexible	Moderately flexible: Once established, surveillance systems are not too flexible. It depends on the design. Surveillance of diseases is very specific	Moderately flexible: depending on the bureaucratic system
No regret: What are the consequences if the option does not have the desired effect of if effects of CC turn out to be not what was expected?	Moderate consequences: Could affect public's perception of health science if option does not have the desired effect; If CC turns out differently it should still provide health benefits	Moderate consequences: Population will not be protected properly if CC turns out differently; If CC and option turn out differently, this has large consequences	Moderate consequences: If health effects are not part of data system, but turn out as important, they might impact on the population; Also economic implications: risk of overinvestment	Moderate consequences: System's implementation involves costs; Data are still useful for non-climate related outbreaks	Minor consequences: It will improve each countries own health surveillance and reporting; It will have some economic consequences though; Moreover, diseases can be undervalued and PH decision not adapted correctly.	Moderate consequences: The population will then not be appropriately protected especially vulnerable groups; Should to some level be country/ effect specific

As can be seen in the table above, all of the options assessed are slightly to moderately costly, and the encroachment criteria tend towards being negative. Also, all the options present a rather neutral situation with respect to 'no regret' scenarios. Nevertheless, all of them present positive impacts and co-benefits of action, with significantly positive assessment of the robustness of the policies.

Group 3: Awareness raising

The policy options for awareness raising are outlined in the table 5.

Table 5: “Awareness raising” policy options

Awareness Raising	
<i>Suggested list of options</i>	<i>Notes</i>
A: Capacity-building	
1. Develop Communication Strategies and Tools (a) geared to different communities e.g. policy, science, public; (b) in close cooperation with journalists; (c) impact-specific distinguishing local (place-specific) and individual level vulnerability; d) using existing frameworks, tools and processes, e.g. weather warning at TV news; e) co-benefits of mitigation and adaptation; f) economic impacts, risks and recourses of adaptation and mitigation	
2. Expand interaction and dialogue with stakeholders including media and citizens for sound information exchange and reporting on climate change and health.	
3. Recommend the establishment of national multi-sectoral steering groups for policy dialogue on climate change and health within countries accompanied by biennial European conferences for European dialogue.	
B: Instrumental	
1. Publish in cooperation with the professional associations, guidance on health impacts and effective interventions on climate change and health;	
2. Provide risk reduction information for behaviours (e.g. on recreational behaviour, self-inspection of tick bites, increased use of protective gears), addressing vulnerable groups in particular;	
3. Introducing CC and Health in all curricula (e.g. modules): risks, adaptation, mitigation for multiple education levels;	
4. Introducing CC and Health in Health/Med curricula (e.g. modules) and other (follow-up) training: risks, adaptation, mitigation	
Enforce plans and procedures for outbreak, episodic and emergency preparedness (e.g. heat wave, disease outbreak, flooding)	Option transferred to Health systems group
Vulnerable areas and risk area (eg. for vectors) mapping	Option transferred to Research group
C: Health-specific	
No health-specific options included or suggested, since awareness raising does not directly affect on exposure or potential health impacts of climate change	

The group selected the following options for analysis:

- A1: Develop Communication Strategies and Tools (a) geared to different communities e.g. policy, science, public; (b) in close cooperation with journalists; (c) impact-specific distinguishing local (place-specific) and individual level vulnerability; d) using existing frameworks, tools and processes, e.g. weather warning on televised news; e) co-benefits of mitigation and adaptation; f) economic impacts, risks and recourses of adaptation and mitigation;
- A2: Expand interaction and dialogue with stakeholders including media and citizens for sound information exchange and reporting on climate change and health;
- A3: Recommend the establishment of national multi-sectoral steering groups for policy dialogue on climate change and health within countries accompanied by biennial European conferences for European dialogue;
- B1: Publish in cooperation with the professional associations, guidance on health impacts and effective interventions on climate change and health;
- B2: Provide risk reduction information for behaviours (e.g. on recreational behaviour, self-inspection of tick bites, increased use of protective gears), addressing vulnerable groups in particular;
- B4: Introducing climate change and health in medical and health curricula (e.g. modules) and other (follow-up) training: risks, adaptation and mitigation.

Several of the options listed under awareness raising were presented by the group as a single overall and comprehensive policy package, as shown in Figure 1 below. The goal of awareness raising is to reframe, interpret and communicate climate change as a societal issue. Communication strategies and tools (A1) are the foundation of this policy package; they should be developed and well-tailored to specific communities. The group suggests that a distinction be made in the following target groups and audiences:

- a) scientific community (broad, multiple disciplines)
- b) policy makers (multiple sectors)
- c) general public
- d) health community and health professionals (all health systems)
- e) vulnerable groups
- f) other: media, consumer groups, NGOs, educators, energy-lobby.

Communication further divides in two activities:

- 1) risk reduction communication
- 2) stakeholder engagement

Both activities connect to options B1 and B4: to develop professional training and guidance. The policy dialogue (A3) feeds into and draws from the stakeholder discussions (A2).

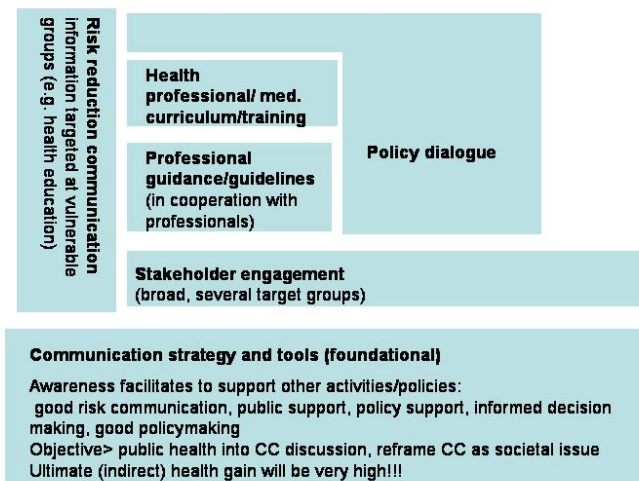


Figure 1: Policy package on Awareness Raising

A table summarising the result of the discussion and assessment of the group can be seen below. The colour codes are based upon the median score; the arguments for the scores are summarized and included in the score boxes.

Table 6: Scores and arguments of the adaptation options under theme ‘Awareness raising’

Legend: **Highly positive**; **Positive**; **In between positive and negative**; **Negative**; **Very negative**

Options →	AR – A2: Expand interaction and dialogue with stakeholders including media and citizens for sound information exchange and reporting on climate change and health	AR – A1: Develop Communication Strategies and Tools (a) geared to different communities e.g. policy, science, public; (b) in close cooperation with journalists; (c) impact-specific distinguishing local (place-specific) and individual level vulnerability; (d) using existing frameworks, tools and processes, e.g. weather warning on televised news; (e) co-benefits of mitigation and adaptation; (f) economic impacts, risks and recourses of adaptation and mitigation	AR-B4: Introducing CC and Health in Health/Med curricula (e.g. modules) and other (follow-up) training: risks, adaptation, mitigation
Criteria ↓			
Impacts: What are the potential impacts (health, social) of the adaptation option?	High impact: Required for broad policy and public support; Awareness and behavioural change in stakeholders can influence society; Involvement of stakeholders is prerequisite for policy implementation and awareness raising	High impact: Prerequisite for policy and public support	Very high impact: Key audience is addressed; GP’s advocating for CC & Health will affect public perception and attitude
Costs: What are the efforts (costs) of the adaptation option?	Slightly costly to organise meetings	Moderately costly: Cost level depends on type of strategy	Hardly any costs, since training can be part of existing curricula
Encroachment: How deeply does the adaptation option encroach on society and the health system?	Not encroaching at all	Not encroaching: This is already a task of the health system	Moderately encroaching: Training will change GP practices
Co-benefits: What are the indirect effects and synergies / conflicts of the adaptation	Positive: Awareness raising connected to areas where stakeholders are related to; health impacts as argument for mitigation	Positive: Communication across sectors	Positive: No effects in the short term, but change in attitude in the long run; There might be a trade-off with other topics in the training/curricula

option?			
Robustness: Can the adaptation option can withstand a wide range of possible future climates?	Very highly robust	Moderately robust	Highly robust: Training is beneficial anyhow, particularly when uncertainties and scenarios can be incorporated in the training
Flexibility: Can the option be easily modified should reality turn out different than expected?	Highly flexible: Stakeholders can be engaged in any manner	Moderately flexible: If reality turns out differently, the content of the message should be changed, which can not happen too often for credibility-reasons	Highly flexible, but follow-up training is required
No regret: What are the consequences if the option does not have the desired effect of if effects of CC turn out to be not what was expected?	No regret: Stakeholder engagement can also have other positive effects regardless of climate change; However, stakeholders may stop trusting authorities if effects of CC turn out differently	Minor consequences, however if communication fails, people may experience health impacts	No severe consequences; some minor health and socioeconomic consequences

Due to time constraints and the in depth discussion on the inter-relatedness of the policy option, resulting in an overall view of an awareness-raising package, the group was only able to complete the structured assessment on three of the policy options, as shown above. Overall, all the options scored positively or very positively for all criteria, with the acknowledgement that comprehensive communication strategies can be costly. The group noted that communication and awareness raising should be a core consideration of any action of policy development in this field.

Group 4: Research, information systems, methods and tools

There is a need to make a list of funded research projects and their results; it is currently difficult to find results on the web and you don't know whether the results that can be found are up-to-date. A centre for knowledge management could take up such a task. Moreover, research is not the only focus; it was suggested to build a network for information and assessment, and establish synergies with programmes on awareness raising and education. Every activity that builds capacity is also creating an incremental approach. This policy strategy on research holds synergies with awareness raising, since there needs to be coordination in providing the evidence and additionally spreading the results as much as possible.

In general, there is a need to guide better the top policy makers on what they really can do.

Table 7: “Research, Information Systems, Methods and Tools” policy options

Research, Information Systems, Methods and Tools	
<i>Suggested list of options</i>	<i>Notes</i>
A: Capacity-building	
1. Build a network on research, knowledge management and assessments, building on existing networks (EU wide and foster activities in MS), and maintain synergies with awareness raising and education;	
2. Finance (a) establishment and operation of a research network; (b) adaptive capacity assessment to establish the baseline; (c) development and implementation of decision-support tools; (d) pilot studies of interventions and actions (top-down and bottom-up); (e) research on health effects of mitigation and adaptation decisions and actions in other sectors, monitor outcomes; (f) research on evaluation of the effectiveness and cost-effectiveness of interventions and actions;	
3. Translation of scientific information to policy and its dissemination	New option added
B: Instrumental	

1. Develop a European harmonized training module on climate change and health and associated policies and measures for health professionals (targeting specific needs of professional groups) and implement it within an existing structure (e.g. tropEd);	
2. Establish an integrated information system for the regular provision of data, indicators, trends, the results of national and sub-national assessments and best practices, in collaboration with the clearinghouse mechanism proposed by the European Commission and relevant agencies.	Some discussion on collaboration with the clearing house. Not yet clear what the latter will entail and how effective it will be.
3. Integrate climate change and health research in a proposed Council recommendation for Joint Programming.	Option is difficult to rate, but is a useful recommendation. Applies to research in general.
4. Vulnerable areas and risk area (e.g. for vectors) mapping	New option added
Revise or develop guidelines for best energy efficient, cheap and carbon neutral practices for health and other public services and provide information on corporate opportunities	Option removed
C: Health-specific	
1. Surveillance and monitoring for heat stress and infectious diseases in relation to climate change	Would be interesting to look at two variants: surveillance/monitoring (a) in general, and (b) specific for heat and infectious diseases. The latter was selected for scoring. The interpretation of monitoring is health data collection.
2. Stimulate best practices that have been demonstrated by science	<ul style="list-style-type: none"> ▪ Some things can be suggested as 'best practices' but are they really? ▪ Should have been demonstrated by science to be the case, before they are recommended. Need to find criteria for, collect and periodically review best practices, and provide best practice guidance.

The group selected the following options for analysis:

- A1: Build a network on research, knowledge management and assessments, building on existing networks (EU wide and foster activities in MS), and maintain synergies with awareness raising and education;
- A3: Translation of scientific information to policy and its dissemination;
- B1: Develop a European harmonized training module on climate change and health and associated policies and measures for health professionals (targeting specific needs of professional groups) and implement it within an existing structure (e.g. tropEd);
- B2: Establish an integrated information system for the regular provision of data, indicators, trends, the results of national and sub-national assessments and best practices, in collaboration with the clearinghouse mechanism proposed by the European Commission and relevant agencies;
- C1: Surveillance and monitoring for heat stress and infectious diseases in relation to climate change;
- C2: Stimulate best practices that have been demonstrated by science.

A table summarising the result of the discussion and assessment of the group can be seen below. The colour codes are based upon the median score; the arguments for the scores are summarized and included in the score boxes.

Table 8: Scores and arguments of the adaptation options under theme 'Research, information systems, methods, and tools'

Legend: **Highly positive**; **Positive**; **In between positive and negative**; **Negative**; **Very negative**

Options →	RIS – A1: Build a network on research, knowledge management and assessments, building on existing networks (EU wide and foster activities in MS), and maintain synergies with awareness raising and education	RIS-A3: . Translation of scientific information to policy and its dissemination	RIS-B1 Develop a European harmonized training module on climate change and health and associated policies and measures for health professionals (targeting specific needs of professional groups) and implement it within an existing structure (e.g. tropEd);	RIS-B2: Establish an integrated information system for the regular provision of data, indicators, trends, the results of national and sub-national assessments and best practices, in collaboration with the clearinghouse mechanism proposed by the European Commission and relevant agencies.	RIS-C1: Surveillance and monitoring for heat stress and infectious diseases in relation to climate change	RIS-C2: Stimulate best practices that have been demonstrated by science
Criteria ↓						
Impacts: What are the potential impacts (health, social) of the adaptation	High impact: The option creates adaptive capacity; Increases effectiveness; Helps to identify the problems; Precursor	High impact: Leads to more relevant autonomous adaptation and positive behaviour of people	Potential health gain is very high	High impact if well-communicated	High impact: Necessary for later policy analysis and evaluation	High impact: Best practices are hard to implement, but enhance efficiency and effectiveness of adaptation

option?	for successful adaptation					
Costs: What are the efforts (costs) of the adaptation option?	Slightly costly: Networks are practically cost-free; Challenge is on real engagement	Slightly costly: scientific evidence should be turned into information for the public and for policy	Slightly costly: Existing education structures are used	Moderately costly: Information is existing, but has to be coordinated	Slightly costly: Many components (ozone, wheather conditions) are already being monitored	Moderately costly: It is costly to stimulate community practices
Encroachment: How deeply does the adaptation option encroach on society and the health system?	Not encroaching: Relatively easy to implement in current system/ setting; Building upon existing infrastructure of experts; Institutionalisation is important	Little encroaching, but societal change will be slow	Moderately encroaching: A certification system should be established	Moderately encroaching: It requires existing systems to adapt; Technical obstacles	Moderately encroaching: Harmonisation is needed	Moderately encroaching: Depends on the practices
Co-benefits: What are the indirect effects and synergies / conflicts of the adaptation option?	Positive: Networking and knowledge goes across sectors	Positive: In communication with other policy fields and sectors	Positive: The training could be interdisciplinary; Enhancing cross-policy and cross-sectoral links	Neutral: The system has some potential for information on synergies/ conflicts and mitigation	Positive: Improving action in other sectors	Positive
Robustness: Can the adaptation option can withstand a wide range of possible future climates?	Highly robust	Moderately robust: Start with the core issues and extend the research and information scope according to climate developments	Highly robust	Highly robust	Very highly robust since it registers if new issues might show up	Moderately robust: Best practices are inert by nature;
Flexibility: Can the option be easily modified should reality turn out different than expected?	Highly flexible: The network can quite easily be reformed according to regulations or needs	Highly flexible: Information can easily be updated, should be careful with changing messages	Highly flexible: The training module should evidence-based	Highly flexible: The flexibility of the system should be built-in	Moderately flexible	Moderately flexible: Needs periodic review
No regret: What are the consequences if the option does not have the desired effect of if effects of CC turn out to be not what was expected?	Minor consequences, since network can adapt and knowledge can be updated	Large consequences; Loosing reliability when done wrong; Less impact than wrong actions; Simply no change/adaptation will occur when CC turns out differently	Minor consequences	Minor consequences if changes are addressed quickly; low-quality data can be misleading	Minor consequences: Lack of surveillance and some loss of costs	Moderate consequences: A wrong 'best practice' may have scientific impacts

All of the options assess present positive impact for actions, but do incur a cost to implementation. There is significant flexibility and robustness of the options, and, with the exception of translation (A3), they do have no-regret properties. Policy options A3 and C2 do present large and moderate consequences, respectively.

Preliminary findings of the group work

Jeroen van der Sluijs, Utrecht University

Participants discussed the validity of the instrument. It was explained that there is no absolute established guideline on assessment of policy choices for climate adaptation decision making. Different methods and tools are available in helping to inform adaptation decisions (for an overview see (8)). The meeting used expert elicitation to collect expert opinion on adaptation policy choices. Practice suggests that the number of experts for expert elicitation lies between six and twelve. (9) The scoring card (Annex II) with the listing of criteria was developed specifically for this meeting. The scoring serves to pre-assess and characterize the options. Similar types of exercises to assess expert opinion on adaptation policy choices have been performed as part of adaptation studies (see for example (10) and (11)). The scores for each option have been compiled in Excel spreadsheet format and have served as a basis for the creation of the four results tables above.

Example: Option health systems option B1 had a high score on the criteria of economic impact

Example: Option health in all policies option C4 had a high score on encroachment

Feedback on the exercise and additional discussion

Participants raised a number of questions, such as the validity of the exercise, if it can be reproduced, the number of criteria and the type of criteria, used. In general, the participants agreed that the exercise was productive and beneficial and could be reproduced after adjustments for a variety of fields. The following were the suggestions for improvement:

1. More guidance on how to best perform the exercise and carrying out the scoring is necessary, with regard to the following items:
 - a. A more harmonized understanding of the criteria would be needed, and more time is needed to clarify the criteria and understand their relevance for each option. In addition to the broad scope of the options presented, the diversity in scores may be related to the difference in interpretation of the criteria.
 - b. Explanation on the meaning of the criteria. For example, with respect to the criterion on equity, clarification is needed on whether it is a goal of the option, or a prerequisite.
 - c. Explanation on how to score, e.g. time aspects (short, medium and long term policy option), time aspect of the impact to be avoided or reduced, institutional scale, etc, should be provided before.
 - d. Weighting of criteria for priority or importance;
2. Reduce the number of criteria:
 - a. Following a brief plenary discussion, a short provisional list covering seven key criteria were proposed:
 - i. Health gains: this criterion should be re-worded to “potential health gains” and thus addressing health burden. This is the ultimate criterion to be considered – the health impact facilitating the health gain of other options. Current policy does not include health considerations; therefore awareness raising is important to raise health arguments as part of the policy. It was suggested to distinguish between direct and indirect/facilitating health impact of options;
 - ii. Costs: this criterion is too narrowly defined and could be reworded to “additional costs and benefits comparison against alternatives for society”.
 - iii. Co-benefits: reword as “non-monetary benefits”
 - iv. Encroachment: this criterion is very unclear but no alternative was given.
 - v. No regret: should be reworded as “without argument of climate change”. This is an important criterion, and in the case of awareness raising, has significant consequences on the credibility when climate change does not turn out as expected.
 - vi. Uncertainty: this criterion is too broad but no alternative was given. In the case of awareness raising, a cautious approach is required in the case of uncertainty; it was also discussed whether there should be a change of focus in communication when not sure of the result.
 - vii. Flexibility

A general prerequisite for carrying out the exercise successfully would be the training of moderators of the group work beforehand. A general interest was stated on testing the refined instrument in national settings.

Participants noted that even with using the seven proposed criteria, there were still difficulties of interpretation, in particular the criteria of encroachment and uncertainty. Selection of the seven criteria was done rather pragmatically starting from the following question: “how can climate change be included in health decision making?”

SELECTING POLICIES AND SETTING PRIORITIES

The six or seven criteria were then used to finalize the selection of policy options and setting priorities. Regarding the criteria, a couple of the groups added extra criteria, such as urgency and flexibility. An overall assessment of the criteria is given below:

- Health gains: this criterion should be re-worded to “potential health gains” and thus addressing health burden. This is the ultimate criterion to be considered – the health impact facilitating the health gain of other options. Current policy does not include health considerations; therefore awareness raising is important to raise health arguments as part of the policy. It was suggested to distinguish between direct and indirect/facilitating health impact of options;

- Costs: this criterion is too narrowly defined and could be reworded to “additional costs and benefits comparison against alternatives for society”.
- Co-benefits: reword as “non-monetary benefits”
- Encroachment: this criterion is very unclear but no alternative was given.
- No regret: should be reworded as “without argument of climate change”. This is an important criterion, and in the case of awareness raising, has significant consequences on the credibility when climate change does not turn out as expected.
- Uncertainty: this criterion is too broad but no alternative was given. In the case of awareness raising, a cautious approach is required in the case of uncertainty; it was also discussed whether there should be a change of focus in communication when not sure of the result.

For the “**Health systems**” options, the selection was based on a voted ranking exercise: option B2 had the most votes, followed in rank order by B1, C4, C1, A2, A1. The group scored the selected set of options against the set of seven criteria as follows. Table 9 shows a qualitative analysis based on the discussion of the participants.

Table 9: Qualitative analysis of the “Health systems” policy options

Options	HS-B2: Develop and implement early-warning and alarm systems	HS-B1: Develop and implement national adaptation action plans	HS-C4: Harmonize and implement guidance on all hazards preparedness	HS-C1: Enlarge and harmonize the current reporting and surveillance mechanisms on infectious and non-infectious diseases	HS-A2: Promote resilience to climate change within all sectors including health sector	HS-A1: Integrate health assessments into other sectors and promote healthy policy implications
Health gain	High	High	High	High	High	
Costs	High cooperation transactions establishing new standardizing	High -costs in infrastructure	Moderate implementation potentially costly	Moderate to high	Moderate implementation could be high	
Co-benefits	High in non-CC areas vulnerable groups	High Except for mitigation	High not necessary in CC	High Better health infrastructure	High	
Encroachment	Moderate Adjusting existing systems	Moderate	Moderate	Variable, depending on existing systems	Deeply	
No regret	Yes	Slightly risk of overinvestment in implementation	Yes	Yes (a bit)	Some	
Uncertainty	Robust	Slightly to moderately robust	Robust	Robust	Moderately robust	
Flexibility	Depends, quite flexible such as communication and infrastructure	Slightly flexible at development, not at implementation	Flexible	Moderate to high	Somewhat/marginally	

It was noted that in the selection of the policy options for “**Awareness raising**”, there was a high degree of interrelation as presented in the first group work session, and that they could be reworked into a single comprehensive package. The ultimate aim of awareness raising should be to put health on the table in the climate change policy discussions. Thus, comprehensive communication strategies are fundamental.

The decision processes for the selection of the six “**Health in all policies**” options were based on the clarity in definitions and arguments used, relevance and their suitability for scoring. The categories did not help much in clarifying different points made as there are various ways of categorization.

When assessing the criteria for the “**Research**” options, the group performed a qualitative assessment, presented in the table below.

Table 10: Qualitative analysis of the “Research” policy options

Options	RIS-A1: Build a network on research, knowledge	RIS-A3: Translation of scientific information to policy and its	RIS-B1: Develop a European harmonized training	RIS-B2: Establish an integrated information system for the	RIS-C1: Surveillance and monitoring for heat stress and	RIS-C2: Stimulate best practices that have been demonstrated
Criteria						

	management and assessments	dissemination	module	regular provision of data, indicators, trends	infectious diseases in relation to climate change	by science
Health gain	+	+	+	+	+	+
Costs	+	+	0	0	-	
Co-benefits	+	+	+	+	+	
Encroachment	0	0	0	+	+	
No regret	+	0	+	+	+	
Uncertainty	+	+	0	+	0	
Total score	5	4	3	5	5	

ADAPTATION STRATEGIES AND INDICATORS

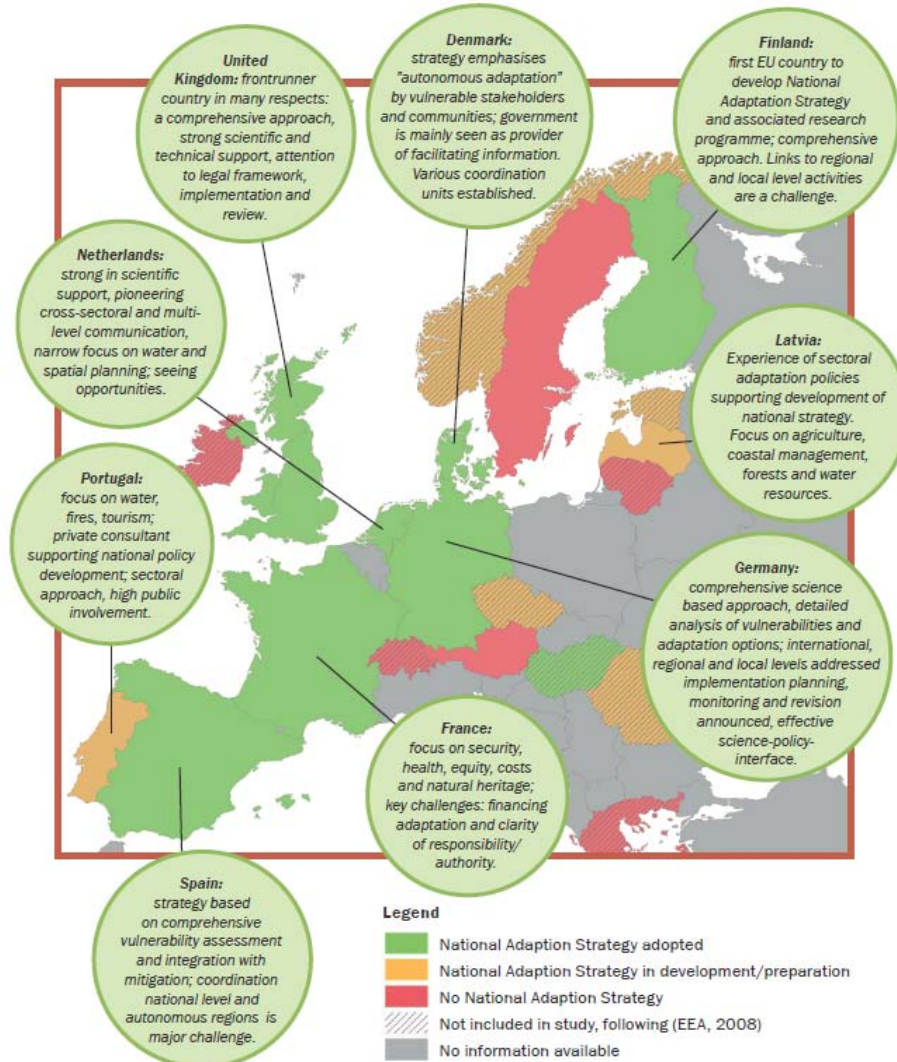
Lessons learnt in developing national adaptation strategies

Rob Swart, Wageningen University and Research Centre

In addition to efforts to reduce greenhouse gas emissions, many EU countries are therefore developing and putting in place adaptation strategies to help them cope with the expected impacts of climate change (see figure below; (12)) In developing national adaptation strategies, the main challenge is to put knowledge into action and there are risks in only focusing on a short-term context. Adaptation is not only taking place within the health sector, and it is important to coordinate actions with other sectors, establishing clear roles and responsibilities.

Figure 2: Implementation of adaptation strategies in Europe

(Source: PEER (2009) Europe Adapts to Climate Change - Comparing National Adaptation Strategies. http://www.peer.eu/publications/europe_adapts_to_climate_change)



Implementation of the European Commission White Paper on Adaptation

Marina Koussathana, European Commission Directorate-General for Health and Consumers

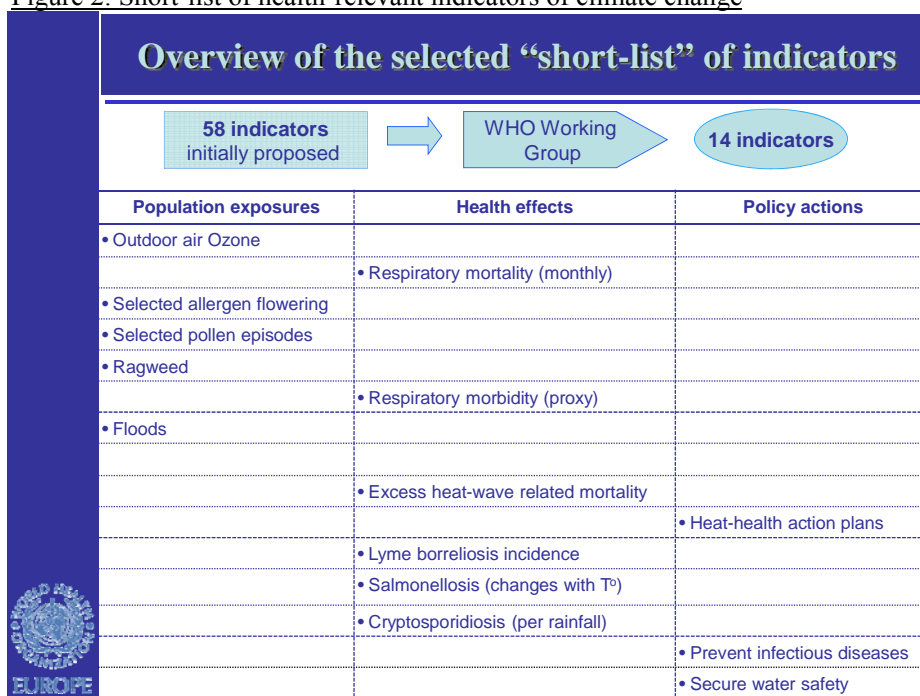
The European Commission White Paper on Adaptation (3) was adopted in April 2009. The White Paper was accompanied by simultaneous publication of various Commission Staff Working Documents on specific aspects of adaptation; in particular, the CSWD on health, and the steps that the European Commission is taking to implement the actions proposed in the White Paper were highlighted.

Development of health-relevant indicators of climate change for Europe

Dafina Dalbokova, WHO Regional Office for Europe

The work on developing health-relevant indicators of climate change has been done within the scope of the CEHAPIS project. In total, 58 indicators were initially proposed, but a final 14 have been shortlisted and are currently undergoing feasibility testing. The indicators cover population exposures, health effects, and policy actions.

Figure 2: Short-list of health-relevant indicators of climate change



CONCLUDING DISCUSSION AND NEXT STEPS

WHO technical background document

The final discussions of the workshop were initially directed around comments on the WHO discussion document and technical background document that was circulated to the participants before the meeting. In particular, for the CEHAPIS background document, any identification of gaps, problems, or additional technical material were requested, including responses to the problems phrased in the document. It was also noted that the full results of the PESETA study (13) are now available, and the relevant sections of the background document will be revised.

Health and uncertainty

Attributing impacts to climate change needs to be considered carefully, as there is a danger of non-climate-related attribution. Furthermore, population growth has not been considered so far, and efforts to reduce carbon dioxide emissions throughout the world are unlikely to be successful if world population size, poverty, economics, equity and environmental degradation are not taken into account; public health is related to development, education and population stabilization.

Policy options

The policy options for discussion were developed in parallel with the discussions on the European Framework for Action in order to present a coherent policy message with respect to climate change and health. This linkage was further strengthened by national representatives of the Task Force on Climate Change and Health participating in this meeting. When considering policy options and criteria, the assessment and prioritisation suggested that this could be done at a national and/or regional level. There are so many linkages and complexities between health and other policies; thus, there is a need to incorporate health in all other areas. There are clearly options and choices to be made and this is a potential future focus for the World Health Organization and PBL.

Methods and appraisal criteria

In an open discussion evaluating the methodology of the two exercises for assessing the policies, a principal concern of the participants was in relation to the redundant approach of the scoring of individual policies in isolation, since assessing each option separately by single criteria risks losing sight of the comprehensive picture and the overall performance and complementarity of a policy package. An additional note is that in some instances the six options selected within each category were partially selected based on their 'scorability'; therefore, non-assessed options during the workshop should not be disregarded in further policy development. Furthermore, the interpretation of the criteria in relation to the policy options was taken forward differently in the four groups. Whereas some groups collectively discussed the option and the interpretation of criteria before starting the individual scoring, the other groups took a more individual approach and started scoring without preceding discussion. The participants suggested that the options could be formulated in a more concrete and specific manner to allow joint understanding of the option as interpretation of the options is critical for scoring. Some participants also noted that the issue of temporal scale was missed in the assessment criteria, i.e. it needs to be considered what policy makers need to do in the next policy cycle versus what needs to be achieved by 2050, the classic timeframe considered in impact assessments.

A further issue to be considered was covered in the discussion on how many experts constitute an expert consultation. Despite a lack of formal guidance on the matter, it was generally agreed that practice suggests that the number of experts required lies between six and twelve.

Overall, the participants agreed that the exercise was generally productive and beneficial, and should be conducted more often and could strongly support the policy development process in many fields. The results of this exercise have provided supporting arguments to the WHO on the selection and prioritization of policy options with respect to the CEHAPIS project, and the assessment results will be used in the subsequent report.

Research needs

Research in the field of protecting health from the impacts of climate change has been increasing, but there is still a gap in applied research on reducing the risks. As many of the threats that climate change poses to health are amplifications of already existing health risks, future research from a climate change perspective should draw on the large research capacity that is already addressing these issues. There is a need for both specialized research that fills out existing knowledge gaps and transdisciplinary research activities between natural and social sciences addressing vulnerability assessments and adaptation. Research agendas of public health interest between research institutions, governmental agencies, and the Ministry of Health are also needed.

In addition, further work is needed in developing the methodology for the exercises undertaken in this meeting, as well as a methodology for the assessment and presentation of the results. Subsequently, an assessment process on the policies selected and prioritized needs to be developed and implemented.

Next steps

1. Comments on the technical background document and the policy discussion document will be collected by the WHO staff; participants were requested to submit any comments on the documents in writing by the end of January 2010.
2. PBL and Utrecht University will analyse and present the results of the policy assessment exercise, as is included here in the results tables.
3. The results of the expert assessment exercise will subsequently be analyzed by PBL and Utrecht University and will consequently serve as input to the WHO CEHAPIS impact assessment process and feed into a PBL study on climate change and health adaptation strategies. This will lead to a subsequent follow-up study on weighing and appraisal of policy options and criteria.
4. The WHO Regional Office for Europe and PBL will finalize the meeting report and distribute it to participants.

5. The policy options will be repackaged and undergo an impact assessment as part of the CEHAPIS project. The participants were requested to submit any suggestions on who can offer the expertise required on this type of policy analysis.

Closure of the meeting

The meeting was formally closed and all the attendees were thanked for their valuable participation.

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ANNEX 1 – EXPLANATION OF ASSESSMENT CRITERIA

Impacts of the option:

- **Health gain:** what is the *potential* magnitude of the health gain of this option? Assume a relatively broad definition for ‘health’. Assume this to be relative to the population size.
- **Economic impacts/costs.** Includes direct costs, as well as indirect economic implications, e.g. costs to companies/households, effects on competitiveness, etc. Includes money as well as other resources. Assume this to be relative to national product and government budget.
- **Social impacts.** This entails many things that could affect public/political perception of an option. E.g., whether an option enhances governmental influence in daily life, whether options enhance or degrade the ‘quality of life’, ‘liveability’ or public safety, etc.
- **Environmental impacts.** Options may have implications for nature/environment. E.g., large scale mosquito eradication could have effects on other organisms, natural systems and general environmental quality.
- **Encroachment/reform:** how deeply does the option encroach on society and the health system? Does the option have major impacts on daily life? Does it require major reforms of the health system (or other systems)?
- **Risk of not intervening.** Entails potential health gain of the option plus e.g. likelihood of health gains, as well as non-health risks (e.g. political, safety, public perception, etc.).
- **Indirect effects and synergies/conflicts.** Side-effects that should be considered when evaluation the option: conflicts with other policy arenas (e.g. water management, public housing), implications for other regions/sectors, and for greenhouse gas mitigation efforts.

Approach and usefulness under uncertainty:

- **Resistance: the option prevents health effects from ever occurring.** Focuses on preventing changes or effects, rather than limiting their impacts. E.g. preventing changes in health effects due to vector-borne diseases through vector-control or vaccinations.
- **Resilience: the option enhances the ability of society/people to deal with effects should they occur.** Entails e.g. quick responses, fast recovery following shocks, enhancing coping capacity through e.g. buffers, redundancy, etc. Limits the impacts of health effects (e.g. changes in heat-related mortality will occur, but option limits the number of deaths).
- **Adaptive capacity.** The option enhances society’s ability to adapt to changes. Often relates to the availability of resources (e.g. funds, social capital, institutional capacity, knowledge).
- **Robustness.** The option remains effective under a broad range of (climatic) conditions.
- **Flexibility.** The option can be easily modified should this be required in the future, or enhances the flexibility of the health care system itself.
- **Coping with statistical uncertainty.** Does the option remain useful (health gain) under the full range of present day quantifiable uncertainties and variability?
- **Coping with scenario uncertainty.** Does the option remain useful (health gain) under the full plausible range of future scenarios?
- **Coping with ignorance/surprise.** Does the option remain useful (health gain) if trends/effects turn out very different than expected (e.g. effect much larger, much smaller, or totally different effects appear).
- **Consequences if option does not have desired effects.** Interpret this very broadly.
- **Consequences if climate effects turn out different than expected.** Interpret very broadly.

Other relevant aspects:

- **Span/specificity.** Is the option highly tailored to a effect (e.g. preventing spread of allergenic plants) or does it reduce a large range of effects (e.g. improving health care)?
- **Public support.** What would be the public reaction to this option?
- **Equity:** do equity considerations play a role? E.g., do certain groups bear the majority of the (economic, social, environmental, etc.) burden of this option?
- **Time aspects: urgency.** How quickly would this option need to be implemented (if it is to still have an effect, if it is not to run into barriers, etc.).
- **Time aspects: implementation time.** How long would the option take to practically implement, following a decision to do so.
- **Geographical/institutional scale.** Does the option focus on local or larger scale?
- **Control type.** Is the option a matter national/international governmental action (top-down), or does it rely on citizens or local governments to take action (bottom-up)?
- **Urban or rural?** Does the option focus on urban or rural effects?

ANNEX 2 – EXAMPLE SCORE CARD

OPTION:

Criteria and scores: *Notes and arguments:*

Impacts of the option

Health gain: what is the potential magnitude of the health gain of this option?							
Very high	High	Moderate	Low	Very low			
Economic impacts / costs							
Highly costly	Moderately costly	Slightly costly	No or hardly any costs	Has net benefits (negative costs)			
Social impacts							
Very positive	Positive	Neutral	Negative	Very negative			
Environmental impacts							
Very positive	Positive	Neutral	Negative	Very negative			
Encroachment/reform: how deeply does the option encroach on society and the health system?							
Deeply encroaching / requires significant reforms		Moderately encroaching / moderate reform needed		Not encroaching / can be easily implemented in current system			
Risk of not intervening							
Very high	High	Moderate	Low	Very low			
Indirect effects and synergies/conflicts							
Other policy fields	<i>Large positive side effects, external benefits or synergies with other interests</i>	++	+	0	-	--	<i>Large negative side effects, external costs or conflicts with other interests</i>
Other sectors and regions		++	+	0	-	--	
Mitigation (greenhouse gas emissions)		++	+	0	-	--	

Approach and usefulness under uncertainty

Resistance: the option prevents health effects from ever occurring					
Strongly increases resistance	Moderately increases resistance	Slightly increases resistance	No effect on resistance	Decreases resistance	
Resilience: the option enhances the ability of society/people to deal with effects should they occur (response, recovery)					
Strongly increases resilience	Moderately increases resilience	Slightly increases resilience	No effect on resilience	Decreases resilience	
Adaptive capacity: the option enables society to adapt/change should this be necessary (resources/knowledge)					
Strongly increases adaptive capacity	Moderately increases adaptive capacity	Slightly increases adaptive capacity	No effect on adaptive capacity	Decreases adaptive capacity	
Robustness: the option can withstand a wide range of possible future climates					
Very highly robust	Highly robust	Moderately robust	Slightly robust	Not robust at all	
Flexibility: the option can be easily modified should reality turn out different than expected					
Very highly flexible	Highly flexible	Moderately flexible	Slightly	Not flexible at all	
How well does the option function under various uncertainties?					
Statistical	Very well	Quite well	Reasonably well	Somewhat	Not at all
Scenario	Very well	Quite well	Reasonably well	Somewhat	Not at all
Ignorance / surprise	Very well	Quite well	Reasonably well	Somewhat	Not at all
Consequences if option does not have the desired effect					
Major consequences	Large consequences	Moderate consequences	Minor consequences	No consequences, option is no-regret	
Consequences if (effects) of climate change turn out to be not what was expected					
Major consequences	Large consequences	Moderate consequences	Minor consequences	No consequences, option is no-regret	

Other relevant aspects of the option

Span/specificity

Holistic, generic, reduces large range of health effects		Targets a certain group of health effects		Highly specific for one health effect or sub-effect	
Public support					
Very high	High	Moderate	Low	Very low	
Equity: do equity considerations play a role?					
Very much	Considerably	Moderately / to some extent	Slightly	Hardly / not at all	
Time aspects: urgency					
Very urgent	Urgent	Moderately urgent	Slightly urgent	Not urgent at all	
Time aspects: implementation time					
Very long	Long	Moderate	Short	Very Short	
Geographical and institutional scale					
International	National	Regional	Local	Individual	
Control type					
Totally top-down	Mostly top-down	Mix between both	Mostly bottom-up	Totally bottom-up	
Urban or rural?					
Urban		Both		Rural	

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