Social analysis of policy options for addressing health impacts of climate change in Europe

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January 2011

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Section 1: Introduction

The origins of good health and well-being are complex. Although genetic, personal and social determinants, public policy and environment all play roles in individual and community health and well being their relative contributions are not fully understood. The WHO defines health as a state of complete wellbeing, not merely the absence of disease (WHO 1946). This approach is an acknowledgement that human beings are embedded within social, economic, environmental and cultural systems which shape and constrain their lives (Assadourian 2010).

The social ecological model of health (McLeroy et al 1988) places the individual at the centre of these embedded and interconnected systems which exert influences on his or her health and wellbeing. The nature of such complex systems is that disturbance to one can cause unpredictable effects on other linked systems. Barton and Grant build on the model developed by Dahlgren and Whitehead (1992) to incorporate the global climate change perspective (Figure 1). It is the purpose of this paper to examine evidence of the likely social impact on individual and population health of climate change.

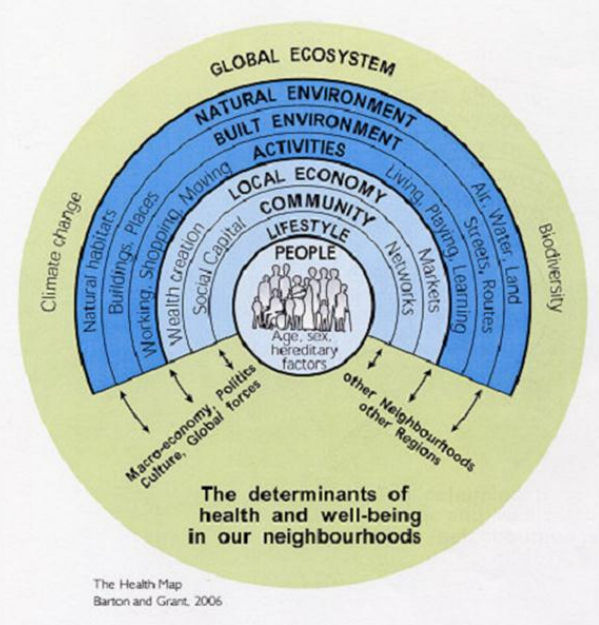


Figure 1: The Health Map (Barton & Grant 2006)

Climate change is a dynamic process, not an event. It will take place in parallel with other change in human and ecological systems, including technological and social change. There is a relationship between the changing climate and both technological and social change, which may be driven by, or may mediate, climate change.

There are current efforts underway to quantify the health risks associated with climate change at the national, regional and global level. It is also important that research focuses on improving the evidence base for effective public health responses to the health-related consequences of change in the environment. Adjusting to the

consequences of climate change will likely require a transformation in economic and social systems, with existing ways of life and economic activity (including, but not only, systems of agriculture) no longer being viable under new environmental conditions (Nelson et al 2007). There is little empirical work on the impact of climate change on employment, and climate change policies often exclude discussion of employment issues (Dupressoir et al 2007). At the same time there are developments in new economic forms which offer positive models of sustainable development. Duggan (2010) discusses the emergence of community food organizations as a response to the inadequacy of state responses to climate change. This grassroots action offers sustainable co-production models with a local focus and can be seen in terms of the emergence of what has been called the re-localization of an eco-economy (Marsden 2010) in which some fraction of production and consumption are reconstructed along low or no carbon lines, with associated increases in participation and social capital formation (Stevens et al 2008). Using more traditional models, Dupressoir and colleagues (2007) focus on gainers and losers from climate related change. They conclude that primary sectors such as fisheries and agriculture will lose most, particularly in the south of the continent, while patterns of some industries (for example tourism) will change – both due to changes in the climate and consequential changes in travel. Initially there may be limited, positive change, however more profound and accelerating change in the climate is predicted with dramatic social, environmental and economic consequences, including aridification in Southern Europe requiring significant remodeling of entire economies. Growth areas, they predict, will include highly technical fields including basic research and development of new, low carbon technologies, leading to increased need for well educated and qualified workforces.

Climate change will impact on human health in a number of ways, with direct and indirect impacts likely. Current scientific evidence predicts growth in the burden of disease and injury following increases in extreme weather events, infectious and vector-borne disease and malnutrition (IPCC 2007). According to Kovacs and Lloyd (2010), it will exacerbate many of the current important environmental determinants of disease. Some climate and weather factors act directly and are relatively well understood—such as the health effects of heat waves or the physical and mental consequences of flooding. Other health effects are mediated by climate-sensitive biological processes, such as changes in infectious disease transmission or crop yields and are less predictable. However additional profound effects can be expected through the impact of climate change on the social determinants of health and its psychological impact. A number of additional factors determine how much people's health will be endangered. These include: the rate of climate change; the resilience of the environment; personal and community resilience; population inequalities and socio-economic differences; support systems and opportunities; health-system strength and financing; access and preparedness; and population health status. The relationship between social position and both physical and mental health status is well documented (Wilkinson & Pickett 2009; Black Report 1979, Marmot 2009, Thomas et al 2010, Fritze et al 2008). Figure 2 models this process, showing the transition mechanisms which lead to changes in health status (Maibach et al 2008). An increase in economic insecurity, the fragmentation of social networks and increasing prices for food, energy and other essentials are potential consequences with impact on health and wellbeing, while psychosocial determinants of health, including risk factors such as reduced personal autonomy, negative self-

perception, stress, insecurity and social isolation indicate stresses which may lead to compromised mental health and reduced resilience (Fritze et al 2008).

The term social exclusion has also become common in academic papers and in policy to describe the relational process through which people and groups become detached and excluded from full participation in mainstream society as a result of a set of interconnected processes including their socioeconomic, health or education status (Percy Smith 2000). Climate change has the potential to lead to fragmentation of social networks, due to economic disruption, fear and forced migration, particularly in the most climate vulnerable communities (Fritze et al 2008). However the emergence of local eco-economic developments (Marsden 2010) promises increased social interaction, networks and social capital formation in the context of nested webs of production and consumption operating within small areas. Marsden's research in the rural UK (2010) highlights new connections at that level which build on existing local assets to supply local demand.

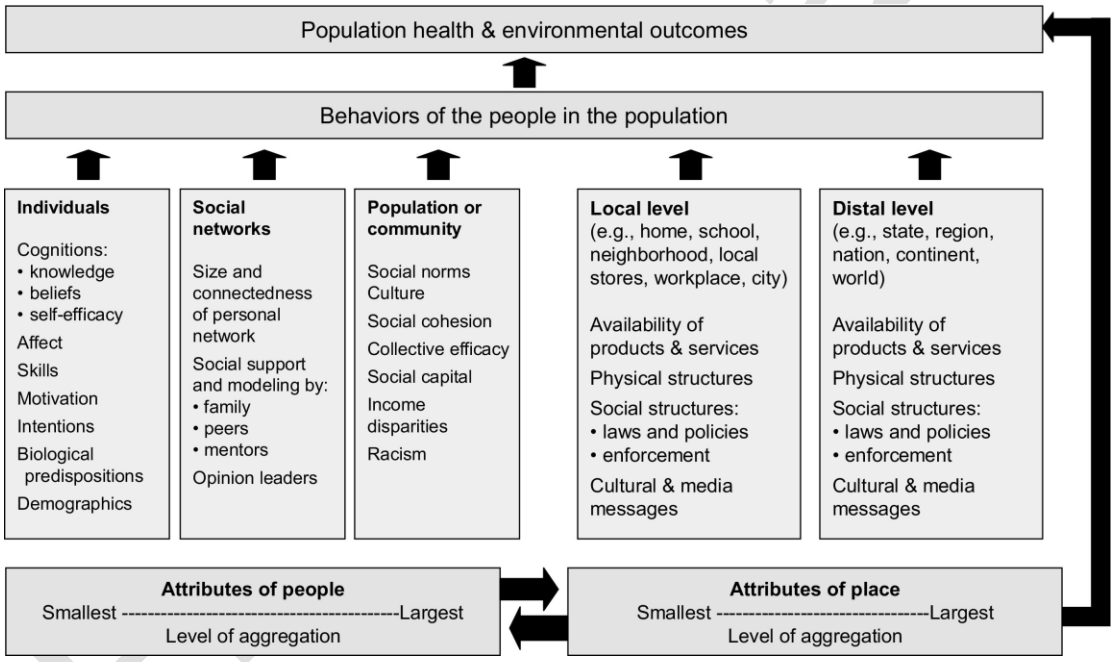


Figure 2: How social determinants impact personal and population health (Maibach et al 2008)

Such a transformation of the economic system implies changes in the scale of economic activity and increased social networking, rebalancing from the distal to the local. However it also begs the question as to whether such a transformation can be inclusive.

The Stern review (2006) concluded that the impact of climate change was differential, with those most sensitive to its impact including people with existing health problems, including poorer health due to social economic disadvantage. However recent UK research finds that people still think of climate change in terms of 'distant' activities, rather than in their own actions (Whitmarsh et al in press). Climate change is observed as global change, but will be experienced locally (OHCR 2008) and those who experience

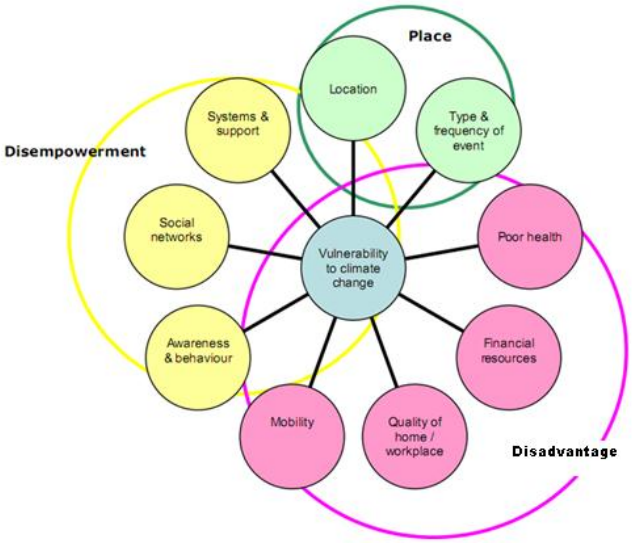
the greatest impact will be those who are most exposed, those who are most sensitive to exposure and those who are least able to adapt to new conditions (Fay et al 2009). Vulnerability is the degree to which a system, community or individual is likely to experience harm due to exposure to a hazard (Turner et al. 2003). Vulnerability in climate change sciences is the susceptibility to harm, and has been defined as a function of the exposure to climate change, the susceptibility to harm (or sensitivity) and the society's adaptive capacity. It is dynamic, and may itself be influenced by climate change (e.g. extreme weather events affecting health infrastructure). Climate change is a stress multiplier that has the potential to augment the negative impacts of other factors, such as demographic change, social tension and land use change, to increase the vulnerability of individuals, communities, and institutions. From a health perspective, vulnerability can be defined as the sum of all risk and protective factors that determine whether a community or region experiences poorer health as a result of climate change (Balbus & Malina 2009). So, vulnerability has an inherent variation, as it affects regions, social groups, population groups and individuals differently. Within a given country or region, there may be 'pockets' of increased vulnerability – even in places where the overall vulnerability of the country is low (Schneider et al. 2007). Across Europe, the most vulnerable to the impacts of climate change are those who:

- Live in places known to be at risk, for example of coastal erosion, exposure to periods of very high temperatures or to extreme weather conditions. *(Place)*
- People who are already socially deprived by the health, level of income, quality of their homes or mobility. *(Disadvantage)*
- People who are disempowered by their lack the awareness of the risks of climate change, the capacity to adapt and who are least well supported by family, friends or agencies. This group will include people at either end of the age range, people who speak minority languages, and those who have existing health problems or disabilities. *(Disempowerment)* (Chalmers et al 2009a)

These categories are not mutually exclusive, Figure 3 below shows the key factors involved and how the three categories relate to one another.

According to the 'SNIFFER' report (Chalmers et al 2009a, Chalmers et al 2009b), the approach to the communication of information on climate change to vulnerable people and communities is crucial in ensuring adaptation and mitigation. For people in disadvantaged communities, climate change is not yet a priority (Darnton 2004), but it is in these communities that people are most vulnerable to threats to their health including poor air quality, flooding and the spread of infectious disease (Lucas et al 2004). In the case of the extreme heat wave in France in 2003, as in Chicago in 1995, it was older people who suffered the greatest mortality. Such prolonged heat was beyond the experiences of many French people, so that they were not prepared to properly adjust their lives to deal with it. While temperature was clearly a vital issue in the deaths, according to some analyses, social and institutional conditions, including the changing nature of the family, played a vital role in survival. Younger people and more affluent groups were able to relocate at the height of the heat wave, withdrawing a level of social support for older relatives. On the other hand neo-liberal changes to the welfare state have led to the withdrawal of State support structures which may otherwise have compensated (O'Brien & Leichenko 2008).

Figure 3: Factors Affecting Vulnerability to Climate Change (Chambers et al 2009b)



Guidance suggests that clarity and consistency in communication are important, as are personalizing communications, working face-to-face and the recipient's confidence in the communicator (Chalmers et al 2009b). This implies that a detailed knowledge of communication and social marketing techniques represent an essential part of the transmission of climate change messages (Futerra 2008). However, the experience with other 'wicked' issues (Blackman et al 2006; MacIntyre 2007) is that communication and social marketing alone are rarely enough and that attention needs to be paid to the complexity of the desired change and to institutional reform, regulation and intensive support for those in the greatest need.

The ability to adjust to changes in the climate is known as 'adaptive capacity', which is determined by factors such as wealth, technology, information and skills, infrastructure, institutions, equity and current health status.

Folke et al. (2003) cite four critical factors that seem to be required for facilitating rapid periods of social-ecological change and reorganization:

- Learning to live with change and uncertainty
- Combining different types of knowledge for learning
- Creating opportunity for self-organization toward social-ecological resilience
- Nurturing sources of resilience for renewal and reorganization

From a social perspective we can think of disadvantage in terms not only of lack of access to material resources, but of powerlessness, lack of voice, social isolation, narrowing of choices and opportunities, loss of dignity and respect. Such a perspective emphasizes the relational, cultural, symbolic as well as material dimensions of disadvantage and links poverty, exclusion and disability to other concepts such as functioning and capabilities, social divisions, agency and citizenship (Lister 2004).

Resilience is a dynamic process which can be fostered though education, the family and social capital within the community (Wang et al 1994, Ferkes & Jolly 2002, Walsh 2004). It is highly influenced by protective factors, which include competencies, skills, capacities and capabilities that the individual can access from within or from their social and physical environment (Dyer & McGuinness 1996, Luthar et al 2000). Crona and Bodin (2010) also highlight the importance of power asymmetries as a potential barrier to the development of resilient communities which can be compromised or enabled by institutional and structural power which can act to shape and limit the desires and expectations of the disempowered (Lukes, 2005; Crona & Bodin 2010)

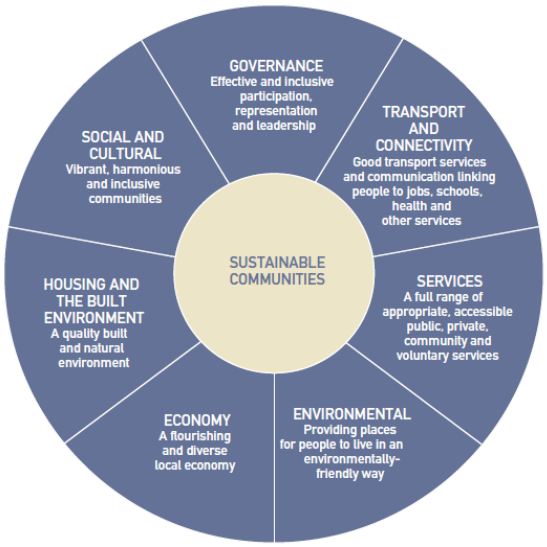
The capacity to adapt to system disturbances is governed by availability of, and the ability to access resources including knowledge, institutions, social capital and the capacity to learn (Nelson et al 2007). The Egan Review (2004) for the UK Government identified the components of sustainable community (Figure 4), these emphasise involvement in community life, access to services and inclusion. The WHO Commission on the Social Determinants of Health (Marmot 2008) recognized reducing power inequities as central to addressing inequality. Folke and colleagues (2004) see promoting resilience as a vital component in maintaining socio-economic systems at times of crisis and identify 'social memory' as embodied within social and human capital as a resource for building adaptive capacity, so that resilience at community level is related to social cohesion, which requires active development and social learning. (Adger et al 2005).

All of these perspective suggest that the interdependence of the ecological and social systems reflect the extent to which a such linked systems can involve people in self-organization and to which they can develop the capacity for learning and adaptation (Folke et al 2004) and they emphasise that to maintain resilience, systems or communities need to be active participants in building adaptive capacity and recovery from extreme weather events and other disasters (Marshall 2009, Perlis et al 2011).

The demands of climate change mean that governments alone cannot hope to steer citizens to successful mitigation and adaptation (Ward 2010), but that citizens as individuals and within community organizations have a significant part to play. Lidskog and Elander (2009) highlight the tension between the democratic process and the urgency of action highlighting the choice between a decision-making ecological elite and the development of more democratic and participatory forms of climatic governance. The UN report on disaster resilient communities concluded that the need was for NGOs to work closely with communities to mitigate the impact of disasters and that a trend towards control by elites and non-participatory methods might could compromise their ability to respond (UN 2007).

Adaptation represents a stream of activities, actions, decisions and attitudes about all aspects of life that reflect existing and changing social norms and practices. In the German City of Freiburg for example, the development of public transport infrastructure and cycling over several decades, achieved by the municipality with the involvement of local citizens, by consistently maintaining goals of discouraging traffic, walkability and support for public transport, have led to significant increases in public transport use, in walking and in cycling, with important health and environmental benefits (Buehler & Pucher 2011).

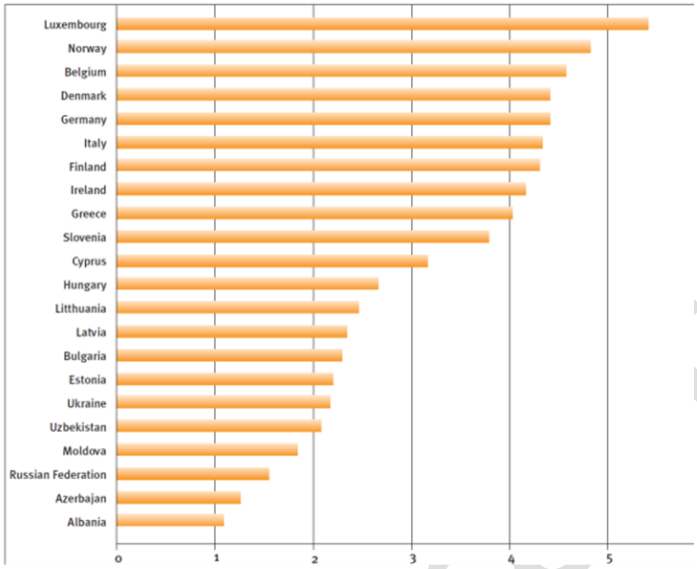
Figure 4: Components of a sustainable community (Egan 2004)



Europe, in the context of adaptive capacity should not be seen as a homogeneous group of nation states, as there is considerable variation in health, culture, social, environment and economic development.

Experts surveyed in 2005 by the WHO ranked income, equity, type of health care system, and access to information as important factors in enabling effective response to climate change. Countries in the WHO European Region vary tremendously in their adaptive capacities. Those with the greatest ability to respond tend to have high incomes, universal health care coverage and easy access to information. Fay et al (2009) looked at some EU states and neighboring countries of Eastern Europe and Central Asia (the former Soviet Bloc) and showed that many of them, including Turkey, Albania, Armenia and Georgia are both very exposed and highly sensitive to climate change, but lack adaptive capacity. By contrast, EU States included in their analysis, such as Hungary, Slovenia and Czech Republic are less sensitive and vulnerable *and* have higher adaptive capacity (Fay et al 2009).

Figure 5: Adaptive capacity index for 22 WHO European countries



Understanding this background to the social analysis is essential in assessing the viability and impact of the proposed policy options. The remainder of this report will draw on this evidence to support the analysis in respect of the health impact of climate change and the suggested policy options for addressing climate change.

Section 2: Methods and Approach

The scope of this document

This analysis focuses on the potential social impact of a set of policy options developed by the WHO for the promotion of health under a changing climate and which will be presented to the European Union, together with evaluations, for the adapting to and mitigating the effects of climate change on health.

In the analysis of policy options, the focus will be on examining the options against socially relevant questions such as :

- Are there health benefits should the policy option be implemented?
- What will be the consequences in terms of the dimensions of the social framework?
- Are there certain member states, regions or population groups that are disproportionately affected or lack the capacity to adjust to the consequences of climate change?
- Does the policy option promote greater equality, integration or coherence within societies?
- Does the policy option have impacts on others?
- How does the policy option impact countries neighboring the European Union?

Not all of these questions will be relevant to all policy options or to all possible implementation strategies, so that reporting will be formatted flexibly to ensure that the most relevant analysis is included.

The meaning of the term 'Social Impact'

By social impacts we mean the consequences to human populations of actions and events that change the way people live, work, play, relate to one another, organize to meet their needs. The term also must include cultural impacts involving changes to the norms, values, and beliefs that guide and rationalize their cognition of themselves and their society (The Interorganizational Committee on Principles and Guidelines for Social Impact Assessment 2003). According to the EU Green paper on options for action (CEC 2008), the most important social impacts of climate change will be on health, migration, social inequality and food security. Of these, only food insecurity is not covered by this report.

The Analysis of Social Impact Data

Social analysis should be carried out within a framework which reflects the practices and processes of societies. Analysis should focus on groups, particularly vulnerable groups within society and discuss the likely variable impacts on them. For example, men and women may be affected in different ways by climate change and have different capacities to respond to its challenges. The analysis will include discussion of a number of aspects of their lives which may be affected:

- their way of life – how people live, work, play and interact with one another on a day-to-day basis;
- their culture – shared beliefs, customs, values and language;
- their community – the cohesion, stability, character of their home and services and facilities available;
- their political systems – how people are able to participate in decisions that affect their lives, the impact of their participation, and the resources available for this purpose;
- their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage which may include a violation of their civil liberties;
- their fears and aspirations – perceptions about their security, their fears about the future of their community, and their aspirations for their future and the future of their children. (adapted from Vanclay 2003)

In the social analysis of the health impact of climate change, these aspects of people's lives will be considered in respect of the three groups most vulnerable to climate change.

The focus of this assessment is on the 27 Member States of the European Union. However, evidence relating to other countries is also relevant as the nature of climate change is global and the consequences of climate change in other, more distant countries is also relevant through subsequent consequences within the EU. Where appropriate, the impact on neighboring countries will be explored, as specified in the final criterion for analysis. In particular, attention is paid to those countries of the European Neighborhood Policy (ENP) that also fall with the WHO European Region.

The CEHAPIS document produced by the European Union focuses on the following potential consequences of climate change on human health:

- Health impacts of extreme weather events such as heat and heat-waves, cold and cold-waves, floods (including coastal and inland floods and sea level rise) and windstorms, droughts and wild fires
- Air pollution related health effects, including respiratory disease
- Vector, food and water borne diseases;
- Health effects related to UV radiation;

The Policy Options

The policy options to undergo analysis are summarized as follows:

- Research and assessment on climate change and health;
- Climate and health in all policies;
- Strengthening health systems in response to climate change;
- Raising awareness of climate change and health; and
- Greening public services.

The development of the policy options was based on the following process:

- Selected scientists were contracted to assess the health impacts of current and future climate change and determine specific population vulnerability (CEHAPIS wp2). The initial assessment of the health impacts of climate change considers the scale and magnitude of the impact, as a basis for action and guided key areas of policy development for subsequent analysis. In addition earlier work carried out with the DG Research (cCASHh, PHEWE, EPN, CIRCE, Ensemble) and DG Sanco (EuroHEAT), the European Environment Agency and the European Centres of Disease control was taken into consideration;
- A meeting was organized on 7-8th of April, 2008, in Bonn, attended by senior public health officials of the WHO European Member States, to discuss the key elements of a health systems response to climate change build on the problem blocks identified in earlier assessments, and built the bases for the health inclusion into the green paper on adaptation to climate change;
- as part of the preparatory work of the preparation of the fifth Ministerial Conference on Environment and Health, a task force on climate change and health worked together to identify the key policy options for the European Region. The "Protecting health in an environment challenged by climate change: European Regional Framework" was welcomed by the 52 European Member States. (Annex 2), in March, 2010;
- 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 in Bonn on 11 12 January 2010 to discuss and assess policy options for effective health adaptation to climate change, for European Union Member States, building on the key policy options identified by the Climate change and health task force (see Annex 3).
- 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.
- The selected policy options were then scored by the experts according to criteria developed by WHO, the Utrecht University and the Netherlands Environmental Assessment Agency (PBL), namely: (a) the impact of the option including health gain, economic impact, social impact, environmental impact, encroachment, indirect effects and synergies/conflicts; (b) the approach and usefulness under uncertainty addressing resistance, resilience, adaptive capacity, robustness, and flexibility;(c) other relevant aspects including span/specificity, public support, equity, urgency, implementation time, spatial and institutional scale, and control type.
- In February 2010, WHO requested for a meeting with the European Commission to obtain feedback on the policy options identified ;
- In parallel a set of indicators are under development to understand trends over time and to help to analyse policy effectiveness over time

Section 3: Social Analysis of the Health Impact of Climate Change

The impact of climate change is not equally distributed (Stern 2006). Some individuals and communities will be affected more intensely and more quickly than others as a result of their relative vulnerability, while those with the greatest levels of resources and power, including human as well as physical and financial resources will be in the best position to respond to climate change. Differential vulnerability will be evident at the regional, national, local and individual level.

Variability in vulnerability is a function of exposure, sensitivity and capacity to adapt. It is related to age, health status and social deprivation. Factors affecting vulnerability to climate change are represented in Figure 3 (see page 5). Many of these factors are also features of socially disadvantaged populations who are already less healthy. The overall impact of climate change may therefore be, without compensatory action, to increase social inequalities in health. Place and social deprivation vulnerabilities are often co-located in the coastal 'mega-cities' like London. New York and Shanghai which are at once the hubs of global economy and the location of extremes of social strata and also seen as 'crucibles of hazard' (O'Brien & Leichenko 2008), where risk is concentrated whether it is the risk from rising sea levels (as in London for example), infection, flooding and typhoons as in Shanghai or drought as in Los Angeles or the more general risk that these and other consequences of climate change pose to economic systems in wider regions or socially deprived populations in and around these cities.

There is some evidence that EU member states are recognizing that addressing environmental concerns may increase inequalities and social exclusion, there is therefore a need for bringing together policy on sustainability and social inclusion, with benefits for human health. UK and Swedish policies are examples of where social and environmental goals are brought together (Lucas et al 2007). In Swedish public health policy for example, the aim is to create the social conditions that will ensure good health throughout the lifecourse and the environmental domain is one of eleven included. Others stress behavior and social conditions. The Marmot Review in England (Marmot 2009) proposes a similar approach, directing policy towards enabling individual and community potential and placing health and sustainability in all policies. The Review concluded that the policy priorities to address inequalities in health have little to do with health services, but should focus on the impact of other sectors to generate better health in those most affected by inequalities. Other work bringing together health, social and environmental systems and emphasizes the co-benefits of greenhouse gas abatement to health, particularly in the area of air pollution and respiratory health (CAN Europe 2010).

In the socio-ecological view, health is constructed through the interaction of a complex web of personal, social, environmental and structural influences which can constrain or promote the health and wellbeing of an individual or a community. National and EU policies represent a high level of the framework within which this construction takes place, but are also conditioned by power relations, culture and social forces which work at a deeper level (Few 2007). Unpicking this web is beyond the scope of this report,

however its impact on the analysis is profound as it underpins the distribution of health impacts across social groups.

All the evidence suggests that the most climate vulnerable countries are in the less developed world and that as a result of increasing natural phenomena, including flooding, coastal erosion, drought and storms, there is the likelihood of increased temporary and permanent migration to Europe and other parts of the developed world. Among those countries bordering the EU, levels of adaptive capacity are known to be low, whereas exposures and sensitivity are high (Fay et al 2009). The IPCC has suggested that there may be as many as 150 million refugees resulting from such impacts by 2050, while other evidence suggests even higher figures and puts the existing migration due to climate change at around 10 million per year (Bogardi et al 2007; ADAM Project 2009). Although not specifically identified within the terms of reference, the consequences of such migrations are important in social (and therefore health) terms. It is likely that migration will lead to increasing social tensions and conflict as direct and indirect result of climate change in Europe. The potential for increased levels of crime and social unrest pose threats of injury in addition to those posed directly by environmental catastrophic events. Fear and insecurity resulting from these consequences of climate change may also damage resilience at a personal and community level, reduce personal health resources and increase vulnerability to mental health problems.

Extreme weather

Health effects of extreme weather can appear in all age groups however, some people are more at risk from extreme weather events such as floods and windstorms and from heat and cold related illness and death than others. A Kovats & Hajat (2008) review for example, showed that the elderly represent the largest defined group at risk of dying due to a heat-wave, especially women and those with dementia or other pre-existing conditions. Children and babies also have limited ability to thermoregulate and are potentially at risk of dehydration and heat stroke. Extreme weather effects also include the impact of storms and cold temperatures. There are seasonal effects which currently result in higher levels of winter deaths which vary by region. Ireland, Portugal and the UK showing high levels, despite not being at the extreme level of temperature variation (Healy 2003). The absence of a simple linear relationship between seasonal temperatures and seasonal mortality means that it is difficult to discern the likely impact of changing climate under climate change conditions.

Other extreme effects (flooding, drought, windstorms and wildfires) have been primarily associated with injury and death due to accident. However flooding can also result in secondary impacts such as contamination of water supply, while other extreme events may secondarily be associated with disruption of water and food supplies or of transport and other services which may have health consequences. The Pitt Report (2008) also noted both positive and negative effects on communities during the 2007 flooding in the UK. While there was evidence of increased social cohesion and neighborliness, there were also incidences of conflict over access to drinking water when supplies were contaminated.

People experience extreme weather events as traumatic, leading, in some cases to long term problems such as post-traumatic stress, panic attacks, domestic violence and strained relationships in additional to initial shock (Fritze et al 2008; Pitt 2008). Mental health can be affected both directly and indirectly in a number of ways. The initial trauma may be followed by significant economic and social disruption, which can manifest in increased psychosocial risk factors for mental health problems and social exclusion (Fritze et al 2008). There is considerable potential for such impacts to have implications for health and other services, both directly and indirectly. In addressing climate change, policy options will need to focus on measures reduce vulnerability and increase resilience of populations that are likely to be the most affected (CEHAPE Pt2).

The destructive impact of extreme weather events might equally have consequences for the health care system, leading to disruption of services affected through destruction of facilities, hazards to staff and communications breakdowns (Few 2007). At the very least, such events will increase the pressure on services. Adaptation strategies need to acknowledge the potential for impact and may include re-siting of facilities and emergency procedures.

Air pollution and respiratory disease

Changes in air quality as a result of global warming are likely to include an increase in illness resulting from air pollution, while those already suffering from respiratory illness are likely to suffer greater levels of disability, particularly when heat related increases in fine particulate matter occur (CEHAPIS).

Those most at risk are vulnerable groups, including older people, children and those who have long term illness. People living in urban areas, particularly those who live in areas of disadvantage are also likely to be affected by such conditions, research has identified 'pollution' hot spots in urban areas, where people are not only exposed to poor air quality, but are also poor, living in poor quality housing and generally less healthy (Walker et al 2003). The over-representation of children in disadvantaged areas and the high incidence of asthma within this population group puts them at increased risk of serious respiratory health problems (Pye et al 2006). Nam et al (2009) modeled the cost (in terms of welfare and consumption costs) of air pollution in Europe and mapping pollution levels shows higher concentrations of low level ozone and particulate pollution in Southern and Eastern Europe, where adaptive capacity is known to be lower. Climate change adaptation and mitigation strategies, as well as the shift from fossil fuels to renewables may have the effect of reducing air pollution, however the pace of change is likely to be greater in more affluent regions. The net benefit to health in terms of reduced levels of cardiovascular disease and respiratory symptoms could be considerable: Nam et al (2009) conclude that welfare savings in the region of 34-48 Billion Euros are possible through adoption of emissions standards proposed by CAFÉ study (Holland et al 2005).

Vector, water and food borne disease

Climate change will alter the ecology to enable survival of carriers of disease in more geographically extensive regions. Changes are already noted in populations of ticks, mosquitoes and sand flies leading to more widespread exposures to vector borne diseases.

Water borne disease is associated with flooding and with increasing temperatures which can change the geographical extent of contaminated water as well as changing levels of contamination and increasing recreational exposure. Insecure water supplies can also result in use of contaminated sources and the concentration of pathogens, particularly among less affluent populations. Vulnerable populations, including older people and those with existing conditions are most at risk. Geographically, low lying areas are most susceptible to flooding, while drought is most probable in southern regions of Europe.

Food borne illnesses such as salmonella and campylobacter are associated with higher environmental temperatures as well as with the consumption of specific foods. Other hazards, including contamination of agricultural land may also lead to illness through the food chain. Vulnerable groups are most at risk of infection and secondary health problems, while changing temperatures also carry the potential for changes in diet preferences, including increasing demand for salads and uncooked vegetables and increased exposure to food and water borne pathogens.

People who have existing health problems are less resistant to infection and more likely to suffer serious consequences as a result, while proximity to bodies of water or flood plains will raise probability of infection through water borne agents. The spread of disease vectors through Europe means that those in the South of the continent will be first affected, while the gradual colonization of the continent by insects and other disease carrying creatures will mean that more Northerly areas will gradually also be affected. The higher densities of populations in urban areas, including those living in disadvantaged circumstances make the transmission of infections, both human to human and vector to human more likely, while other socially excluded populations, including ethnic minority communities may not have sufficient access to communications and warnings to reduce their exposure.

Health effects of UV radiation

Exposure to ultraviolet solar radiation is linked to the incidence of skin cancers and to conditions of the eyes which carry the risk of loss of sight. The impact of greenhouse gases on the ozone layer has already led to dramatic increases in skin cancer in certain parts of the world. UV radiation has also been linked to immune system suppression (CEHAPIS). People who have fair skin are more susceptible to the effects of UV radiation on the skin (primarily skin cancers) (Fluhr et al 2008) so that even though Southern Regions may be most affected by increases in UV Radiation, there is potential for

increases in skin cancers to affect fairer skinned populations further north. Australia has undertaken extensive education and health promotion around the impacts of UV Radiation. Hill (2004) and others (Suraiya 2004) conclude that this has had limited success, although there are demonstrable savings in terms of health care costs (Hill 2004). Hill's view is that preventive behaviors (including changing modes of dress, seeking shade and modifying daily activities) represent major cultural changes which may take many years to achieve. Such a conclusion has implications for behavioral responses to climate change which similarly require major cultural adjustments.

Perhaps one of the problems for skin cancer prevention is that not all health impacts of solar radiation are negative. Sunshine remains an important source of Vitamin D, which has an important role in preventing disease (Grant 2002), particularly in children and older people. There is also some evidence (CEHAPIS for refs) of positive behavior change linked to improved diet and physical activity may also be ascribed to increased levels of sunlight. Conversely there are links between poorer mental health and lack of sunlight (Partonen & Lönnqvist 1998, Kent et al 2009) indicating that wellbeing may be enhanced by limited exposures.

Section 4: Social Analysis of Specific Policy Options

Policy Option 1: Health Intelligence

1. Business as usual – no new action
2. Expand *ad hoc* data monitoring to facilitate the exchange of information on data, trends, and best practices/policies as well as to stimulate research cooperation on climate change and health.[1]
3. Specific additional research, e.g. in the areas of:
    a) improved risk assessment of the health effects of climate change and other environmental changes to inform decision-makers;
    b) comprehensive evaluation of the effectiveness and cost-effectiveness of interventions;
    c) co-benefits for health of mitigation and adaptation decisions and interventions in other sectors;
    d) effectiveness of climate sensitive infectious disease surveillance, extreme events health action plans and other decision-support tools;
    e) impact and adaptation costs as well as the costs and benefits of interventions.
    f) Major monitoring systems including the extended ENHIS-integrated information platform[2] for the regular provision of data, indicators, trends, the results of national assessments and best practices/policies, in collaboration with the clearinghouse mechanism proposed by the European Commission and in cooperation with the WHO and other relevant agencies. Further research

Potential health benefits

In social terms, the impact of this Policy Option is limited, however more broadly, the importance of a more general improvement in access to intelligence, information and knowledge for developing climate change adaptation cannot be overestimated. Successful adaptation to climate change is dependent on information about the necessary magnitude of adaptation required, about how to adapt and the human, social and financial resources needed to undertake the process (Fussell & Klein 2000).

This Policy Option implicitly recognizes and seeks to generate action towards improved knowledge in limited areas. A more effective approach to policy would be to support technologies to make knowledge on the threats and possible responses to climate change available more widely. Health impacts are more likely to arise from the socioeconomic and ecological consequences of change than from changes in disease vectors.

[1] Research priorities have been elaborated by the 2009 WHO publication "Protecting health from climate change – Global research priorities"
http://www.who.int/globalchange/publications/9789241598187/en/index.html

[2] As proposed in article 36 of the European Regional Framework for Action adopted at the Fifth Ministerial Conference on Environment and Health on 12 March, 2010.

An important step in adaptation is combining and bringing together knowledge systems from disciplines such as sociology and ecology. Therein lay opportunities for enhancing adaptive capacity. Lay and expert knowledge is gathered and used within the health and wellbeing system at a variety of levels from the strategic to the personal. For the professional audience, health intelligence enables more efficient health service planning, meeting the health and wellbeing needs of populations in a cost-effective way. Health knowledge also includes burden and distribution of disease, information on the social determinants of health, the effects of treatment, impacts and alternative approaches to service delivery. Climate science contributes contextual knowledge of the probable and possible consequence of global environmental change as well as the technologies of adaptation and mitigation. A changing incidence of disease relies on the integration of health research, Intelligence and knowledge bases with social and political evidence as the basis for planning appropriate and efficient services. Investment in the development of health knowledge provides a return in terms of improvements in health and wellbeing.

Links with other policy options

All Policy Options are linked within a program of adaptation and mitigation. Knowledge accumulation and translation from basic and applied research to policy and lay communities are prerequisites for successful action. The policy option is an essential step in the process or mitigation and adaptation of health impacts of climate change, however at present it may be too narrowly specified. More flexibility in the support for health impact of climate change research, especially research which addresses the social determinants of health and the health inequality aspects of climate change impacts would be helpful. To be successful, all policy options will require that access to relevant research and knowledge is improved and that the dissemination and communication of health knowledge related to climate change is effective.

Recommendation

Broaden this policy option to promotion of wider access to public health and climate change knowledge and information. Include advocacy of multidisciplinary approach to health information. Make explicit links with Policy Option 4 – Health Awareness.

Policy Option 2: Health Systems

1. Business as usual – no new action
2. Integrate climate change into EU Generic Preparedness
3. Strengthen surveillance, early-warning and health security, integrating IHR.
4. Complete overhaul of health system adaptation planning, including preparedness and capacity development of primary care, to strengthen health systems in response to climate change.

A pilot Joint Action funded over five years within the EU, including relevant agencies and organizations such as WHO and relevant EU agencies, on how to:

- 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, cold, floods, infectious disease outbreaks) and identification of vulnerable population groups in particular;
- Develop and enforce plans and procedures for outbreak, episodic and emergency preparedness;
- Enlarge and harmonize the current reporting and surveillance mechanisms on climate sensitive infectious and non-communicable diseases and other threats to health to include potential new and re-emerging diseases in Europe;
- Develop harmonized guidance and assessment procedures on greener and more sustainable and safer health services and assess the benefits for human health.

Health Benefits

The health impact of the health system (if considered as limited to health professionals working within health institutions) on health is comparatively small but very important. Planning and response are important areas for preparation, however it is in the wider social, economic and ecological systems that the greatest benefits will be realized in health terms. The principal impact of health system preparedness may be on mitigation of uncertainty among populations. Uncertainty within the general polulation, whether due to weather events or other, longer term phenomena can lead to change in their ability to practice day-to-day tasks, particularly when they involve face-to-face interpersonal contact. Health systems in general provide security as well as treatment services to populations.

Strengthening specific parts of the system will enable states to offer greater protection individually and collectively to their populations, particularly in the areas of infectious disease and preparation for extreme weather events. The development of the health system to adapt to climate change may have impacts on equality, integration and coherence within states. Integration, conflicts and new demands on health services may also result from the migration of substantial numbers from those states in the global south which will be first affected by significant climate change.

Although the role of health systems in preventing illness is limited, it is important particularly in the case of infectious disease. The international response to Swine Flu

represents a demonstration of how multi-agency and multi-sector collaboration led by health can happen on an international scale, and while the pandemic did not transpire, the preparedness enabled states to be in a position to deal with outbreaks as they occurred. The health sector also acts as an advocate for health improvement actions led from other sectors, which achieve health goals.

Climate change should result in impacts on the provision and location of health facilities. Audits and assessments of the vulnerability to extreme weather and sea level rise, as well as resilience to outbreaks will be important areas for consideration in the planning of new facilities. Ensuring that systems are resilient to shocks such as flooding should become an essential part of health facilities planning.

Impact on inequality and across the social strata

Although this policy option concerns change within the health system, there is already long established evidence (Tudor Hart 1971) that disadvantaged people have poorer access to high quality health services than the average, while health systems are not equally developed across the EU. Policy options which apply to the health system should consider equality of access for the least well off, who are over-represented among vulnerable population. The development of the health system to adapt to climate change may have impacts on equality and coherence within states.

Coherence and equity may be challenged by the migration of substantial numbers from those states first affected by climate change. Such migration would include many most in need of health services, while as a result there is also likely to be an increase in the level of need for mental health services (Pitt 2008).

It is not only through the provision of specifically health services that the health system can impact on climate change, they represent major employers and users of resources in their own right. Health systems are major enterprises with substantial carbon footprints. As such, they are well placed (as are local governments and major private sector businesses) to play the role of climate change champions showing community leadership.

Impact across the EU and in other countries

Access to services is also not equal across the EU, with States in the South of Europe and the newest of the member states having generally poorer access. Where the most modern technology is not readily available the challenge to develop new surveillance systems may be greater although there may also be some benefit from the shared development of notification systems.

Frontiers are not barriers to the carriers of disease, nor extreme weather events. The near neighbors of the EU have, in some cases already had to confront the consequences of climate change, including the growth of vector and water borne disease that the 27 States of the Community are now contemplating.

It is essential that work is undertaken in concert with these and more distant states and with international organizations to monitor the spread of communicable disease and to develop measures to mitigate the effects. The WHO Global Outbreak Alert and Response Network is one international resource that monitors and provides information on outbreaks.

Impact on other policy options

If health systems recognize their position as influential organizations, they can play an important role in developing climate change awareness in populations and promoting the sustainable use of resources (Policy Option 4).

There may be other impacts on other policy options, although this policy option is most likely to be the beneficiary of impacts from Options 1 and 2.

Recommendation

Focus policy option on building resilient health care systems, acknowledge potential for contribution to reduction in health inequalities and importance of e

Policy Option 3: Health Mainstreaming – Health and Climate Change in all policies

1. Business as usual – no new action
2. Revision of impact assessment guidelines to include greater emphasis on integrating health in all policies and climate change.
3. Support Member States to develop their Impact Assessments and to integrate health in all policies through development of harmonized guidelines

Potential Health Benefits

Public health is a multi-sectoral activity, which relies for success on the collaboration across all sectors with recognition of health goals. For the most part, public health goals are achieved through joint action, with public health professionals often playing the role of advocate or evaluator. The health sector enjoys considerable status and tends to take on leadership of activities, enjoying trust and the confidence that motives are positive. When public health activity breaks down or fails to achieve its objectives, however the need for collaborative activity and the advocacy role continues.

The harmonization of good practice across the EU in the areas of public transport, housing quality, safe water and other public health priorities is an aspiration which States will have differential capacities to deliver. The convergence of such standards might be a priority for the use of EU development funding which could yield substantial health benefits over the long terms.

Health impact assessment, healthy public policy and health in all policies are developments in the public policy field which are less acted on than discussed, but have the potential for revolutionizing the social impact of public policy. They can have the effect of promoting joint action across policy areas (such as health and environment) and by ensuring that methodologies are participative, can empower and enable disadvantaged communities.

EU Directive 2001/42/EC requires that Strategic Environmental Assessments (SEA) are carried out on certain public policies and plans before they are adopted. This technique attempts to systematically assess the impact of developments on a range environmental dimensions. Such assessments include health as one of their dimensions. While, unlike SEA, health impact assessment is not a statutory requirement, it has on occasions (DH 2007) been used within an SEA to provide a full assessment of health impacts. Such an approach enables health concerns related to all of the dimensions of the SEA to be included. In the case of the SEA of the London Plan (DH 2007), it ensured a close dialogue between policy makers and health stakeholders throughout the development of the plan. By adopting a social ecological model of health within these approaches, the sustainability of social practice, health and wellbeing within the context of climate change can be assessed. By including health and climate in the consideration of all policies, their impacts in these areas are made open and transparent, enabling scrutiny of policy making.

Many, if not most, actions to protect health from climate change are the primary responsibility of other sectors, with the health sector playing an advocacy, monitoring, and/or technical advisory role. The influence of the health sector in this should not be underrated as it can add a gravitas which may not be perceived within the responsible sector. Measures to be taken outside of health include: protecting the population from heat and cold (for example through building standards) and air pollution (for example through non-polluting energy production and green transport), controlling vector-borne diseases (through improved better water, sanitation and land management), and water issues such as water availability and flood control (through water management and environment protection). Predicting the health impacts of climate change is uncertain and, it is not possible to estimate the number of illnesses or deaths that will be avoided through such actions, or how much health and wellbeing will be improved by the cooperation with other sectors yielding health benefits. However, in the case of extreme weather events, illness can be prevented by improved planning and disability reduced by supporting those who experience disruption following such conditions. The longer term serious effects of extreme weather events on mental health and wellbeing that have been noted in reports (Pitt 2008) and extensively studied in the case of Hurricane Katrina in the USA (Lawrence et al 2007).

The health sector also has a 'corporate citizen' role in reducing its own carbon footprint, with consequent health co-benefits. By reducing green house gas emissions in buildings in the UK, savings of 0·6 megatonnes of carbon dioxide, per million population and 850 disability adjusted life years were achieved using a strategy of combined fabric, ventilation, fuel switching, and behavioral changes (Wilkinson et al 2009) Alterations to agricultural production such as technological improvements and a 30% reduction in livestock could reduce UK greenhouse gas emissions by up to 50% by 2050. Such a change would decrease ischemic heart disease by an estimated 15% (Friel et al 2009).

Impact on inequalities and across the social stata

This policy option has the potential to work at a structural level in building resilience and adaptive capacity within vulnerable groups. To do so, a participative approach is required, involving vulnerable groups in the process of assessment of legislation across all areas of policy. The emergence of 'bridging organizations' working between disadvantaged groups and communities and statutory agencies seem to lower the costs of collaboration, enhance conflict resolution. Enabling legislation and governmental policies can support self-organization of 'third sector' organizations to work at a community level. A resilient social-ecological system may find ways to use crisis situations as opportunities for creative transformation (Folke et al 2005, CAP EU 2010), working with local NGOs and citizens and taking advantage of policy 'windows', when the potential consequences of climate change events are brought to public attention. Within this policy option is the kind of synergy between health and environment that is required to meet dual goals and to mitigate impacts.

The Adelaide Statement (WHO 2010) further emphasizes the importance of working across sectors on issues which have multiple and complex causes such as inequalities in health. The centrality of the idea of 'health in all policies' to breaking free of the silo approach to policy making in the context of global change and economic crisis offers the

opportunity to develop an innovative and sustainable approach to policy making (WHO 2010). This represents a challenge to the health sector, to become conversant with approaches across other spheres of policy, as well as to broader policy area to develop literacy in health. If fully implemented, the policy options should have an impact on equity and inequality, incorporating the development of new democratic spaces for participation in decision-making, building social capital and adaptive capacity at a local level, however there will be a crucial need to ensure that the learning and skills necessary for participation in policy processes are available to all. This is an important issue within Policy Option 1, so that only by ensuring that policy options are combined will desired outcomes be achieved.

Impact across the EU and in other countries

By including vulnerable people in health planning processes, their needs and views can be more comprehensively included. Health impact assessment, healthy public policy and health in all policies require an open and accessible process which includes participation in the development of adaptation. In some member states, politicians are among the least trusted members of society (Sala-i-Martin 2009), whereas in others they rank as much more trusted. The implications for this policy option are that whereas in Scandinavia and Luxembourg, for government to assess health impact of policies or conduct other such studies may add to the confidence of citizens, in the UK this would not be the case and such an undertaking might be the remit of an NGO or academic unit. Within the developing transnational community observed by Lidkog & Elander (2009), the voices of politicians and bureaucrats might be moderated by others from civil society offering alternative interpretations.

There is no specific impact on neighboring countries which are less well developed in terms of systems to deliver assessments of health impact, however the health impact of climate change related migration, given the increased vulnerability of these as a result of climate change is an important consideration which will require discussion in all policy discussions. This may include significant additional need for mental health services as a result of the consequences of social and cultural dislocation, the potential for social exclusion and extreme poverty (Fritze et al 2008)

Impact on other policy options

The policy option supports the development of improved policy planning and will have an impact on joint action, which is generally supported by these approaches. Access to good quality knowledge from a range of intellectual disciplines is a prerequisite for assessing health impacts of policies across other areas. This emphasizes the importance of the developments outlined and discussed in Policy Option 1 as an essential component of this Policy Option.

Recommendation

This Policy Option has important consequences for health improvement and the reducing health inequalities by making explicit the health impacts of all policies.

Strengthen guidance on requirement for health impact assessments (including climate change impacts) of cross cutting policies at EU level, advocate wider implementation of HIA at national and local level by public sector and within private sector.

Policy Option 4: Health Awareness

1. Business as usual – no new action
2. 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, where possible, within existing structures. This could be incorporated into health and medical curricula (e.g. modules) and other (follow-up) training: risks, adaptation, and mitigation.
3. Develop further research awareness options through a harmonized framework at EU level to assist Member States in developing national communication strategies and tools:
    a) geared to different communities e.g. policy, science, public;
    b) in close cooperation with journalists and expand interaction and dialogue with stakeholders, including media and citizens, for sound information exchange and reporting on climate change and health;
    c) that are impact-specific, distinguishing local (place-specific) and individual level vulnerability and provide risk reduction information;
    d) building on existing frameworks, tools and processes, e.g. weather warning at TV news

    A pilot Joint Action funded over five years within the EU, including relevant agencies and organizations such as WHO, and European Union Agencies, to:

    - Develop harmonized guidelines and framework at EU level to assist Member States in developing national communication strategies and tools:
    - geared to different communities e.g. policy, science, public;
    - in close cooperation with journalists and expand interaction and dialogue with stakeholders, including media and citizens, for sound information exchange and reporting on climate change and health;
    - that are impact-specific, distinguishing local (place-specific) and individual level vulnerability and provide risk reduction information;
    - building on existing frameworks, tools and processes, e.g. weather warning at TV news;
    - 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, where possible, within existing structures. This could be incorporated into health and medical curricula (e.g. modules) and other (follow-up) training: risks, adaptation, and mitigation.
    - Due to the nature of the instruments proposed, the focus of this assessment should be on the 27 Member States of the European Union[3]. However, where appropriate, the relevant impact on neighboring countries should be explored, as specified in the final criterion for analysis. In particular, attention should be

[3] **European Union 27 Member States**: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, and the United Kingdom

paid to those countries of the European Neighborhood Policy (ENP[4]) that also fall with the WHO European Region. Existing technical documents on all health topics as well as published literature and previous social shall be taken into consideration. All tasks will be carried out in close contact with the WHO GCH team.

Potential Health Benefits

For the individual, gathering, interpreting and making sense of health knowledge and intelligence can lead changes in the level of satisfaction with their current health state, however it is one of many inputs into personal health which will contribute to feelings of wellbeing. Information dissemination from trusted institutions can have significant impacts, evidence from recent outbreaks of infectious disease suggests that care is required in the dissemination about the spread and danger of disease. Studies in the UK have suggested that information giving through media can be effective in alerting people to the likely impact of infections and that these are most effective among populations who may be described as more vulnerable, however media reproduction of health research is not controlled and may be flawed. Mass communications media seek to address other agendas which may influence what is published, in what form and with what additional messages attached (Seale 2003), however they are also important for many people as sources for information on climate change.

The translation of research and intelligence into health knowledge within policy, lay or other arenas plays an important role in merging knowledge from different disciplines (Strauss et al 2009). Knowledge translation is a process and a strategy that can lead to improved outcomes for stakeholders. Unlike dissemination activities, knowledge translation is a concerted activity designed to lead directly to change. Furthermore, it differs from the traditional diffusion process because it is primarily an active and manipulated process that involves "all steps between the creation of new knowledge and its application and use to yield beneficial outcomes for society" (Canadian Institute for Health Research 2004 p4). It is through knowledge translation that academic research and intelligence is transformed into change in health policy, or perhaps health behavior.

The co-benefits of emissions reduction in terms of a reduction in the incidence of disease, particularly respiratory disease have been demonstrated (CAN Europe 2010). However the growth of walking and cycling as a means of personal transport has benefits in increased physical activity, which impacts health in a number of ways including reduced incidence of heart disease and improved musculoskeletal health.

Additional health improvements, particularly in reduced stress and improved mental health and wellbeing might be expected from increasing awareness of (and knowledge of mitigation measures for) the potential for extreme weather events such as floods

[4] **European Neighbourhood Policy** Countries: [only considering those countries that also fall within the WHO European Region]: Israel, Moldova, Ukraine, Georgia, Armenia, and Azerbaijan .

(Pitt 2008). Fritze et al (2008) identify the potential for dis-benefits to occur: they theorize increasing levels of depression and despair from the full realization of the importance of climate change. Here, there is a lack of evidence and further detailed research is required, however we can discern that popular understanding of climate change is a self-mediated framing of issues that includes media representations filtered through social interaction. And the social construction of climate change might result in the amplification or dampening of perceived risk (Reser 2004; Fritze et al 2008). For many then, the resulting emotions engendered by awareness of climate change are hopelessness, distress and anxiety. One approach to addressing such negative thoughts is to focus therapeutic efforts on building social capital through the potential for personal and collective action, and the opportunity to participate in decisions (Fritze et al 2008).

Impact on society, inequality and across the social strata

Effective public health action requires joint action at a number of levels. Action between states can have an impact on pollution and emissions, water quality and transmission of infectious agents, action within a member state between agencies can improve the coordination of policy and the impact of adaptation and mitigation initiatives. In the UK, local authorities have signed up to the 'Nottingham Declaration', a compact which commits then to address climate change adaptation and mitigation through their roles as service providers, estate managers and community leaders. Similarly, 80 organizations in Cornwall have committed to address the social, economic and environmental issues of energy supply and demand (Idea Knowledge Network 2005). However less formal joint action also has the potential for impacts on climate change related health promotion.

Issues of communication are extremely important and careful consideration of the approach to the sharing of health knowledge is essential in delivery of this Policy Option. The delivery of health knowledge in appropriate forms to both professionals and citizens will enable the informed changes in ways of life needed to adapt to and mitigate the impact of climate change. Communications are required to improve the general level of knowledge about climate change, its consequences and approaches to adaptation and mitigation; about the need for immediate and, longer term, personal action; and to stimulate behavior change. Personal lifestyles and behavior are notoriously resistant to change, however there is a growing literature which suggests that social marketing approaches can be effective (Grier & Bryant 2005) and that health promotion approaches which empower people to participate. Adger (2003) argues that personal adaptation is a function of access to resources, which would include personal resilience, capability and social capital as well as other health assets (Morgan and Ziglio 2007). In Europe, most people believe that climate change is a serious problem, although this varies from 96% in Cyprus to 59% in the UK, however only about half of EU citizens feel informed about what to do about the changing climate (Eurobarometer 2009). While the information deficit might be tackled through concerted institutional action, that is unlikely to be enough to generate the desire for personal change to be forthcoming (Lorenzoni & Pidgeon 2006).

The role of the media in communicating climate change issues is important, however experience shows that they do not always transmit messages in context or effectively. According to Antilla (2005), news organisations circulate and shape knowledge to the wider public and play an important role in setting the political agenda. A powerful component of journalism is the construction of news themes and frames. The theme is the idea that connects 'semantic elements of a story', including descriptions of action, quotations, and background information, 'into a coherent whole'. Framing is a process of attaching meaning to events, interpreting and connecting them to everyday life (Boykoff & Timmons Roberts 2007). In the US, Antilla (2005) found that despite broad agreement among scientists, news organisations primarily drew on news reports, rather than original sources and constructed climate change in terms of uncertainties, debates and controversies, often referring to the science as flawed and focusing on alternative explanations.

Whitmarsh and colleagues (in press) note the uncertainty and complexity associated with climate change as well as the media representation of climate change as controversial and debated within the scientific community, a phenomenon which Michaels and Monforton (2005) label 'the manufacture of uncertainty'. In the absence of a cogent and consistent presentation and understanding, personal as well as collective action in support of adaptation and mitigation will be ineffective. Whitmarsh et al (in press) note the prevalence of the view that sources of climate change are believed 'distant' causes (such as industry and deforestation) rather than personal behavior. They also found a lack of *desire* to change, despite some recognition of the potential impact of personal choices. Partly responsible for such findings is the level of credibility assigned to forecasts of long term change. While in some places there may be both high knowledge and high confidence in scientific research, this is not the case everywhere and preparedness for climate change events or longer term adaptation will depend partly on these expectations. In coining the phrase 'carbon capable' to denote the level of general understanding of climate change issues, They conclude that carbon capability is currently limited, in terms of decision-making (knowledge, skills, motivation, judgment); individual behavior or practices; and broader civic and community engagement. Furthermore they note that climate change is not a salient consideration in everyday decision-making for most people, and that misperceptions exist. The considerable policy challenge of this option is to enhance the effectiveness of knowledge translation activities and carbon capability and to convey the need to engage with climate change as well as consequent health issues.

Climate change adaptation, like health promotion activity carries the risk that it will actually increase inequalities in health as those who are more aware and more willing to make changes are more affluent and better educated. Vulnerability, however is concentrated among those least healthy and who have higher levels of social deprivation. If carried out sensitively and appropriately the policy option could contribute to narrowing of inequalities in health by improving health knowledge of all sections of the population. The literature suggests (eg Ebi & Semenza 2008) that central to the engagement of less affluent (and more vulnerable) populations is the generation of forms of social capital and the evolution of a learning community, so that the route to awareness is not a direct one. Existing top-down structures tend to exclude vulnerable populations from participation in the discussion and formulation of action

plans as well as in scientific research. Notable in the development of engagement are less formally organized initiatives and the emergence of loose structures of governance, which enable less stressful approaches to interactions with agendas, but retain access to resources for change, including shared social learning. The participative nature of such structures and the self-governance emphasize equality over hierarchy in building resilience and adaptive capacity (see for example Carlisle et al 2007).

An example where governance relies not on rigid hierarchies but is distributed is the Transition Towns movement, however there are other self-governing ground level initiatives such as farmers markets, food co-ops and community gardens have synergistic impacts on health at a personal level (Venn et al 2006; incredible-edible-Todmorden 2011). The notion of adaptive governance (Folke et al 2005) generally involves decentred institutional arrangements, which may function autonomously within a framework of ethics or beliefs or more concrete structures which may be local, regional, national or global with loosely held links or networks rather than legal frameworks. Aggregation can build influence or strength, but might also stifle innovation. Such organizations function similarly to social movements, relying on the glue of shared belief and common purpose to hold them together and can provide arenas for novelty and innovation and enhance flexibility, all of which tend to be stifled in formal governance structures (Folke et al 2005).

Recent research (Holt-Lunstad et al 2010) suggests that strong personal and social relationships are most important in determining levels of wellbeing, indicating the need to consider the interpersonal in terms of joint action across areas of understanding. Spencer (2007) argues that health harming behaviors like smoking, poor nutrition and a sedentary lifestyle are not simply the result of evidence informed choices, but are embedded in the understanding of social norms and practices and the circumstances of people's lives, influenced by their past experiences. They are the result of complex interactions between social and environmental factors and understandable if health is seen in social ecological terms. Recent work reiterates this, finding that on-line social network ties can influence health behaviors (Centola 2010) and we can extend the same logic to personal behaviors linked to climate change.

Folke et al (2005) report on examples from the South Pacific and South America, where indigenous local knowledge and traditional practice has been used in concert with scientific research to create sustainable systems in fisheries and forest management. Local knowledge is central to such change, as it is in the re-localization of food economies observed by Marsden (2010). In Denmark, the government sponsored ecocities initiative has established exemplar communities in energy use and emissions (ecocities 2010). Such action provides good practice models internationally as well as having local benefits, including health benefits, however a similar initiative in the UK was met with considerable skepticism (Booth 2008). Most people in the EU believe that people themselves could do more to combat climate change, although already most take some action (Eurobarometer 2009), however there is growth in grassroots action and networking across borders. Grassroots community action such as those in the Transition Network (www.transsitionnetwork.org), have the potential to deliver such change, linking local actions across boundaries. The Transitions Network currently includes 321 informal and official initiatives connected through social networking,

though these are concentrated in Northern and Western countries of the continent. Where information and communications systems are less well developed, it will be more challenging to ensure that good practice evidence is accessible.

Vulnerable groups, particularly people who have learning disabilities, older people and people who have mental health problems will have most difficulty in participating in discussions around health knowledge without significant levels of support and making information appropriate to their abilities. While engaging people who are disadvantaged by their social, cultural, environmental or economic circumstances requires an approach which acknowledges these additional barriers and adds to their vulnerability (Ebi & Semenza 2008). In general, information should be made available in forms and through processes which are appropriate to audiences, including linguistic and cultural minorities. The delivery of information face-to-face by trusted individuals can improve take up and understanding and help in the construction of social capital (Ebi & Semenza 2008).

Impact across the EU and in other countries

Working in the USA, Corbett and Durfee (2007) discuss how the reporting of climate change has altered through time. Initial sources for press stories were scientific, with uncritical reporting, however later and at least partly because of the journalistic tradition of balance, interest groups, business and politicians entered the discourse, with results reported by Gelbspan (1998) as acting to introduce uncertainty and scepticism. Similar conclusions are reached by Whitmarsh's research in the UK, which represents an important warning that the task of educating people on the potential for climate change to impact their lives has not been fully achieved. In the 'quality press' in the UK, Carvalho (2007) found that ideology was an important factor in the framing of the issue, with conservative newspapers emphasising the uncertainty as well as endorsing existing economic ideology, while more liberal papers emphasised scientific consensus and the potential damage to ecological stability resulting from existing economic practices. (Carvalho 2007)

In France, Germany, the Netherlands and other European countries, the focus has remained on the science, with little coverage or attempt to air controversies or sceptical views (Olausson 2010; Dirikx and Gelders 2010). However how national culture and interest can alter coverage is emphasised by (Tynkkynen 2010) who discusses how in Russia, climate change is framed by journalists against a background of Russia as a global power and influence in world affairs and a duty to participate in the world-wide efforts to address the issue.

Climate Change is a global phenomenon and action in one region has potential consequences elsewhere. Published scientific knowledge is universally available, while successful knowledge translation activities provide models of good practice which can be shared through publication. Establishing forums for the sharing and discussion of locally generated action on a global scale might lead to wider impacts in neighbouring and more distant countries, utilising electronic media and the internet as vehicles for dissemination of knowledge. Countries bordering the EU tend to be more vulnerable and less able to adapt to climate change (Fay et al 2009), either at the societal or the

individual level. The Eurobarometer survey identifies countries to the East and South of Europe, including Turkey, Bulgaria, Rumania and the Czech Republic as least well informed about the causes or ways to adapt to climate change (Eurobarometer 2008). Davies (2005) reports that transnational networks of local agencies have emerged to share knowledge and experience of local action, though initiatives like Transitions Network, which is available globally have not penetrated significantly into states to the east. Lidslog & Elander (2009) see the potential for the development of new democratic spaces within transnational networks which bring together organisations from both formal institutions and civil society, and they question whether such global issues fit well within the context of the traditional nation state structure and conclude that nation states are but one player in a 'choir of voices' that also includes NGOs, private sector companies, the medical and scientific community and social movements. This Policy Option could operate as a broker for the further development of such networks existing alongside formal links between States and professional networks.

Whether knowledge leads to action is an important issue. Some limited evidence (Eurostat 2010) suggests that raising the issue of climate change repeatedly has led to local and personal action, however in Finland, survey research found that there was near universal acceptance of climate change as a scientific fact and a threat, despite a concurrent increase in domestic energy use (Koskela & Vinnari 2009). This example of the translation of climate change knowledge to climate change action is part of quite a complex picture. If we examine recycling rates among EU partners, those in Scandinavia and Northern Europe consistently exceed those of the UK (which may be more influenced by the US approach to media coverage) and those of Southern and Eastern countries where infrastructures and information are less able to support action (Eurostat 2010).

Impact on other policy options

This Policy Option draws together issues from the others. It will be essential that there is integration of action and that adaptation is deliberate, rather than forced or inadvertent (Nelson et al 2007). The planning for system wide transformation appears a necessity. Such transformation can include new and innovative approaches to decision-making, participation in civic discourse and learning.

The involvement of key trusted individuals persons provide leadership, trust, vision, meaning, and they help communities into learning environments. Adaptive forms of governance which emphasise participation and social networks can enable communities to engage with unfamiliar knowledge systems and experiences for the development of a common understanding. (Folke et al 2005)

Recommendation

This should be the major focus for policy action by the EU and EC. They should adopt an enabling role for developing transnational action and awareness. There should be additional efforts to promote 'good' science and the sharing of knowledge within the EU and internationally.

Policy Option 5: Greening Health Services

1. Business as usual – no new action
2. Develop harmonized guidance and assessment procedures on greener and more sustainable and safer health services. Implement pilot projects.
3. Full-scale implementation of greening public services within the Member States, using the health system as a leading example.

Potential for Health Benefits

Since the Brundtland Report (1987), sustainability has gained traction as an issue among public service institutions. While the general consensus of the need for change and sustainable futures holds, it nonetheless may clash with other societal goals and priorities, including economic growth (Boelie et al 2004) also it may also be consistent with others. The health benefits of progressing the green agenda within public services have been highlighted as far back as 1996 (Jackson & Roberts, 1996), but progress towards a sustainable health system has been slow and uneven.

Organizations as well as individuals have responsibilities as contributors to greenhouse gas emissions. Eurobarometer (2009) found that most EU citizens believed that private industry could do much more to combat climate change. Corporate citizenship has a role both in altering organizational behavior and as an example to workforces, clients and wider society. Health systems themselves have immense purchasing power that can be used positively, they use immense amounts of energy and other resources (renewable and non-renewable), and produce significant amounts of waste (Wise & Nutbeam 2007). In the UK, there are examples of change made by organizations within the health sector in purchase of locally produced food; "green travel plans" which encourages walking, cycling, and using public transport; and reducing carbon emissions by creative energy management (Coote 2009). Younger et al (2008) note the potential for the built environment (including health care facilities) to make a contribution to improved health and climate change adaptation. They point out that the built environment not only forms a framework for life in urban spaces, but also influences human choices. Additionally, there is a disproportionate impact on the most vulnerable so that strategies in or led from the health sector and partnerships with other sectors in development have the potential for reducing carbon footprints and contributing to adaptation and resilience.

The Local Government Information Unit in the UK identifies three ways in which major organizations, including health service institutions can promote climate change awareness: through actions as an organization reducing their own carbon footprint, through the services it provides, ensuring that it assists its partner agencies and clients in reducing theirs carbon footprint and as a community champion, demonstrating ways to contribute less to climate change (LGiU 2010). The health system is nested within the economic, social and ecological systems and so initiatives to 'green' the health system both impact, and are impacted by the state of wider systems with respect to climate change. Health makes a considerable contribution to the European and national economies: in the UK alone, health services employs 1.3 million people, consume about

one per cent of all the energy used in the UK and spend £17 billon (20.4 billion Euros) on goods and services (Coote, 2006). In 2006, the Department of Health in England released a toolkit for 'Good Corporate Citizenship' (Department of Health, 2006), declaring that:

> *'How the NHS behaves - as an employer, a purchaser of goods and services, a manager of transport, energy, waste and water, as a landholder and commissioner of building work and as an influential neighbour in many communities - can make a big difference to people's health and to the well being of society, the economy and the environment.'*
> (Department of Health, 2006)

By recognizing the benefit of leadership, health systems (and public services in general) show what it possible in terms of change for institutions as well as becoming examples for individual citizens. Corporate citizenship implies a broader definition of the function of organization, the corporate citizen has responsibilities beyond ensuring that the goals of the organisation are satisfied, responsibilities as part of society to participate in wider societal goals (Elkington 2006). Recent survey evidence (Business Green 2011) suggests that the private sector engages with green issues primarily for marketing purposes, arguing that the benefit of greening their business is seen in terms of improved corporate reputation. Green public services could demonstrate that there are more tangible benefits.

Poor quality and ill maintained buildings result in excess resource use for heating and cooling and have other recognized health effects. Internal air quality is a risk factor for asthma and other upper respiratory ailments (Daisey et al 2003) and is also associated with the growth of mold and other microorganisms which can lead to a range of health problems (Cox-Ganser et al 2005).

Health services are major consumers of products, from paper products to cleaning products, medicines and travel. Health services are also major employers. They have the potential to alter the marketplace through their consumption of good, for example reducing the levels of harmful chemicals in cleaning products and increasing the uptake of green transport options.

Impact on society, inequality and across the social strata

Greening health services is both the beginning and end point of policy options. This approach to policy inevitably impacts on all other policy options. Achieving green health and public services will require increased awareness on the part of health planners, managers and practitioners. With the greater ongoing awareness of green objectives across health or all public services this will stimulate growth in knowledge and ensure that climate issues are considered in across policy making.

While the aim of greening services within a stable structural framework has merit, it may be worth noting the impact of the 'transitions' movement, which focuses on relocalising production and consumption (Marsden 2010). Although not necessarily problematic for this policy option, there is the risk that if public services maintain a

centralized focus while consumption and production are increasingly localized, that there is a lack of coherence of the systems, leading to disruption and breakdown. If this is the case, the additional dimension to greening public services is to localize control and decision-making.

Impact on the EU and Other Countries

There is currently no comparative information about actions to green public services across the EU or internationally, however by promoting green health and other public services and disseminating experience, the EU might have a significant influence on neighboring states' public service sectors and provide a model for transnational sharing of experience within the private sector.

Impact on other Policy options

There are important synergies between this and other Policy Options. Options that focus on health systems should be seen within the context of sustainable health systems as promoted within this Policy Option. The impact of green health systems as exemplars can be magnified by increasing climate change and health awareness, while the proposals for including health and climate change and health in all policies form the framework within which green health services is validated.

Recommendation

The Commission should give strong support to efforts to green public services, beginning with health services. Initial activity might include an audit of local schemes and sharing of knowledge.

Section 5: Synthesis

While climate change is accepted within the scientific community, widely within the political community in Europe, and generally within society as a whole, progress on the development of adaptation and mediation strategies has been slow and sporadic. Climate change policies need to acknowledge that both adjustment and system transformation may be necessary and that both institutions and individuals will be required to respond to challenges. Policies should encompass institutional transformation to switch focus to sustainability, population mobilization and system learning directed at developing adaptive capacity and resilience at system and community level. Recent research in the UK (Whitmarsh et al in Press) suggests that climate change is often viewed as 'someone else's problem' and there is an unwillingness to adapt social practices. Others suggest similarly that it is seen primarily as a scientific issue, which has also become a political issue through international conferences and contested science, however it has not been sufficiently recognized as a social issue affecting all citizens and all economic sectors (Dupressoir et al 2007).

In the swiftly developing world, particularly China and India, there also appears to be reluctance to alter the path of development previously trodden by Europe and North America, with global consequences including political tension as well as potentially compromising efforts elsewhere to mitigate climate change impacts.

Health impacts of climate change cannot be averted or treated effectively without concerted global and society-wide action. This will require high quality information presented persuasively, continuous monitoring and evaluation and joint action. It also calls for the leadership of champions and exemplars, particularly to promote action across the private sector. Areas where action will be required include expected changes in disease incidence, social practices, geographical location, timing (e.g. season) and population group.

The focus of the policy options presented is on top-down structural change, rather than on local or individual level change. The balance of EU wide, national, local and individual action is an important issue, as are global agreements on the importance of action. Berkes (2002) suggests that neither purely local, nor higher level management works well enough by itself, but that local involvement at community level can lead to building sustainable practice and hence devolution of responsibility to a low level promotes optimum resource use. However without the development of a framework which promotes equity, such an approach may fall into the trap of reproducing inequalities in health (Nelson 2007). How vulnerability is defined and by whom is a question that needs to be considered. While 'objective' definitions of 'disadvantage' are available through data sources, Kreutzman and Macnight (1993) argue that professionals and bureaucracies make assumptions about people in poverty as 'bundles of pathologies' or problems to be solved. The inclusion of vulnerable and socially excluded groups within climate change decision-making structures remains under-researched (Farrell & Minev 2010, Tompkins et al 2008), although it has been the focus of specific interest internationally in recent times, indeed the Commission on the Social Determinants of Health (2008) made addressing power imbalances one of its primary

recommendations in addressing inequalities. This is particularly important as difficult choices will have to be made about where to sacrifice and where to invest. Ebi and Semenza (2008) amplify this point, emphasizing the role of social capital formation in developing community level change that will support the development of the values and attitudes that underpin adaptation as well as those which support health improvement in disadvantaged communities. Tompkins (2008) cites the example of coastal erosion in which, while some coastal areas (such as East Anglia) may be left to erode, massive investment has been forthcoming for coastal and flood defenses in other areas (London for example). In discussions, residents of coastal areas were reluctant to support action without 'proof' that damage to the coastline will occur, though acknowledging that it may then be too late (Few et al 2006). Doria et al's (2009) conclusion is that adaptation should be successful in terms of economy, environment and society and over short and long term, however where choices are contested, inclusion of all voices also appears essential for any definition of success. It is clear that top-down frameworks need to recognize the need for community level change to support adaptation. Successful adaptation in the economy requires refocusing activity towards low carbon production. Alternative models, including a growth in local food production and new economic forms which have health benefits in terms of improved access to fresh food as well as in terms of reduced emissions, (Duggan 2010; Marsden 2010) have been advanced, while from a more traditional view, such a shift might mean growth in services and research and development accompanied by further decline in high carbon primary and heavy industries (Dupressoir et al 2007).

There is evidence that public values can be altered by events as well as the action of opinion leaders (Nelson et al 2007). Leadership in climate change may require identifying and utilizing policy windows, such as extreme weather events to invest in adaptation and mitigation structures as well as utilizing public institutions as leaders in areas such as green design and purchasing. The creation of a policy support framework at EU level represents one approach to preparing for focused policy change at national and local level.

New forms of governance are also a component of successful action. The growth of social movements and networks which transcend political boundaries (Lidskog & Elander 2009) cannot be ignored and provide new forms of institution which cross frontiers. Developing and understanding of the implications of new forms of governance is an important area for detailed research. It is possible that health and wellbeing can be sustained in Europe; and measures put in place to address adverse health impacts as they occur, quickly and effectively. Hence, knowledge accumulation, and crucially translation, as well as developing improved intelligence, including health impact assessment in all policies and working across borders in joint action will help reduce the impact of threats to health and wellbeing. Moreover, in most cases and in most countries, existing systems are already in place and can be expanded to incorporate additional threats.

An important consideration missing from the proposal for change in health systems is the mental health impact of climate change. There is accumulating evidence of the impact of extreme weather events on mental health, especially among vulnerable groups, including people in disadvantaged communities and children (Weiss et al 2003).

There are three important implications of climate change for mental health. There are the direct impacts of extreme weather events which are likely to have immediate impacts on the prevalence and severity of mental health problems in affected communities as well longer term impacts for people and for mental health services. Second, there are indications that vulnerable communities are beginning to experience disruptions to the social, economic and environmental determinants that promote mental health. Finally, there is an emerging understanding that climate change as a global environmental threat may lead to emotional distress and anxiety about the future (Fritze et al 2008). Further research on impact of climate change on mental health is urgently required.

The challenge from climate change for some analysts is a technical one of harmonizing adaptation policy with spatial planning policy (De Bruin et al 2009), while for others it represents more a social and cultural transformation which will have impact at all levels of society (Ferkes 2005). Smith et al (2009) call for a strategic 'architecture' at national government level which will facilitate the development of adaptations policy. Such a framework would consist of leadership, institutional organization, stakeholder involvement, climate change information, appropriate use of decision analysis techniques, explicit consideration of barriers to adaptation, funding for adaptation, technology development and diffusion, and adaptation research. This represents a mix of the technical and the interpersonal, demonstrating the importance of insights into the social psychology of social change through consideration of barriers and reliance on leadership and involvement as facilitators of change. A neglected role that might be included here is the notion of "choice editing," (Assadourian 2010) in which governments encourage good choices while discouraging bad ones, this can be through subsidy, taxation (as in landfill pricing) or outright bans of unsustainable technologies such as the incandescent light bulb.

It is clear that no single policy option will alone have a major impact on health and wellbeing, though all may contribute to the mitigation of and adaptation to climate change, and their impact may be cumulative. Health information is necessary prerequisite for all other policy options but is not sufficient on its own, providing evidence in different forms for change in the public policy process, within the health system and within the population as a whole. Incorporating climate and health in all policies can be seen as a transformative shift in the policy which requires a reevaluation of the approach to health policy (and therefore a review and adjustment of health systems). There is insufficient understanding of the ability of institutions to adopt climate friendly approached to policy making or implementation. Research is required that examines the readiness of EU States to implement coherent multi-agency processes to adapt to climate change. The joint actions proposed within Policy Options 3 and 4 build upon such change towards a shift in individual and community knowledge and attitudes and health-related practices, some of which may have beneficial impacts in terms of individual health and global sustainability. These are necessary steps, but not sufficient and should represent the construction of a framework within which national and local policies can develop specific adaptive actions.

We cannot forget that there are long terms trends in social policy globally that may themselves have an impact on the ability of EU States to develop adaptation in their communities. It could be argued that nation states (and collections of nation states) are

poorly equipped to undertake change of the nature required through vertical communication channels, but that it is the horizontal interaction between citizens that is more likely to result in changes in social norms for resource use (Marcus & Dombrowski 2009). However grassroots organizations, while they may leverage change at a local level, can rarely effect change on a greater scale (Mitkin 2001). Such an analysis suggests action is required simultaneously at many levels, from the personal to the global, so that focus at EU level on supporting and stimulating bottom up action and transnational activity might be valuable. The growth of globalization and the advent of a neo-liberal turn in economic and social policy has increased the liberalization of trade, while reducing public control over industry and led to the decline in welfare safety nets (O'Brien & Leichenko 2008). The impact of globalization on vulnerability and adaptive capacity has been felt differentially, with developments in one place reverberating across the globe.

There remain unknowns within this field, including the uncertainty about the pace and extent of climate change, and the unpredictability of health-related change, both in terms of disease processes and change in the social determinants of health resulting from changes in the environment and there is a need for more research and the development of new knowledge in this area which crosses scientific and social scientific disciplines.

Section 6: Conclusions

Climate change will have far reaching impacts on the European Union. There remains a good deal of uncertainty about the detail of the impacts in terms of society, the economy and the environment. The suggested policy objectives for addressing the health related impacts of climate change in Europe provide a reasonable beginning as a basis for developing EU policy in climate change, however there are a few issues which need to be addressed to ensure that policy develops in an equitable and effective way.

The policy options as currently written appear overly top down, relying on action from the EU and national governments. Government action is necessary but not sufficient to ensure the growth of adaptive capacity across Europe. Developments in the policy options such as choice editing, which transform them into a process for facilitating change might assist in producing positive movement towards increased adaptive capacity. New technology enables different approaches to community organization and development, the growth of transnational networks for the dissemination of climate change information is beyond the control of the EU, but may be worthy of development and support. Such approaches are particularly underdeveloped in the emergent member states and in the South of Europe, as well as in neighboring countries. Concerted collective action to stimulate the growth of networks and community level action in these regions is possible.

While aspects of the physical health impact of climate change are adequately addressed, there remain two areas of deficiency within these policy options. First, there appears an underlying biomedical model of health, which is inappropriate in respect of change within the social, economic and physical environment. It is likely that impacts on the social determinants of health in addition to the environmental determinants will be more far reaching and profound. Secondly, the concentration on physical health neglects the impacts on mental health, which constitutes a major source of disruption to lives as well as resulting in high levels of disability. The Evidence shows that there may be considerable mental health impacts, particularly following extreme climate events, but also as more understanding of climate change develops in the general population. Unless there is sufficient anticipation and understanding of such effects, the additional pressure on mental health services across Europe will be unsustainable.

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