

SUMMARY OF RISKS TO HEALTH AND HEALTH INEQUALITIES OF CLIMATE CHANGE, MITIGATION AND ADAPTATION		
	HEALTH	HEALTH INEQUALITIES
<b>DIRECT EFFECTS OF CLIMATE CHANGE</b>	<p><b>Health of all groups may be put at risk by:</b></p> <ul style="list-style-type: none"> <li>• Ground level ultraviolet radiation (UVR)<sup>i</sup></li> <li>• Extremes of heat and cold<sup>ii</sup></li> <li>• Poor air quality<sup>iii</sup></li> <li>• Land and water pollution<sup>iv</sup></li> <li>• More/new air and water borne diseases due to changing environmental conditions<sup>v</sup></li> <li>• Vector-borne diseases like malaria, dengue fever<sup>vi</sup></li> <li>• Food-borne diseases<sup>vii</sup></li> <li>• Crop failures and food shortages, causing decreased access to nutritious foods<sup>viii</sup></li> <li>• Drought and water shortages<sup>ix x</sup></li> <li>• Heavy precipitation events<sup>xi</sup></li> <li>• Flooding and storm damage (leading to homelessness, <sup>xii</sup> dislocation, <sup>xiii</sup> post-traumatic stress<sup>xiv</sup>)</li> <li>• Migration-related health effects<sup>xv</sup></li> </ul>	<p><b>Health inequalities may be increased:</b></p> <ul style="list-style-type: none"> <li>• Groups at most risk include: <ul style="list-style-type: none"> <li>– Low-income groups<sup>xvi</sup></li> <li>– elderly, very young, chronically ill and socially isolated – increased risk of heat-related mortality<sup>xvii</sup></li> <li>– those living in South-East England – worse effects of water shortages, in part due to population growth<sup>xviii</sup></li> <li>– urban populations – greater temperature rises due to air pollution and urban heat island effects<sup>xix</sup></li> </ul> </li> <li>• These groups are more likely to: <ul style="list-style-type: none"> <li>– Live near to sources of pollution<sup>xx</sup></li> <li>– Live on flood plains<sup>xxi</sup></li> <li>– Lack access to diverse sources of food<sup>xxii</sup></li> <li>– Lack insurance against damages<sup>xxiii</sup></li> <li>– Lack resources to invest in adaptation to changing conditions</li> </ul> </li> </ul>
<b>INDIRECT EFFECTS OF CLIMATE CHANGE</b>	<p><b>Health may be put at risk due to indirect effects of climate change:</b></p> <ul style="list-style-type: none"> <li>• Large-scale impacts and systemic shocks will have negative impacts on health, <sup>xxiv</sup> for example, due to <ul style="list-style-type: none"> <li>○ Migration<sup>xxv</sup></li> <li>○ Conflict<sup>xxvi</sup></li> <li>○ Associated stress, anxiety and depression<sup>xxvii</sup></li> </ul> </li> <li>• Devastation of land and resource constraints will also contribute to migration and conflict</li> </ul>	<p><b>Health inequalities may increase as disadvantaged groups are hardest hit by:</b></p> <ul style="list-style-type: none"> <li>• Restriction of development programmes due to: <ul style="list-style-type: none"> <li>○ rising costs of implementation</li> <li>○ other priorities for spending: <ul style="list-style-type: none"> <li>• \$44bil required before 2015 to make investments more climate-resistant</li> <li>• \$2bil needed for climate-related disaster relief (HDR, in stern 2009)</li> </ul> </li> </ul> </li> </ul>

Appendix 2: Health impacts of climate change

		<ul style="list-style-type: none"> <li>Difficulties in daily living, for example due to water scarcity in developing countries<sup>xxviii</sup> → \$40 billion required to compensate poor people (although costs cannot be accurately predicted, and will rise)<sup>xxix</sup></li> </ul>
<p><b>EFFECTS OF MITIGATION</b></p>	<p><b>Health risks from measures to mitigate climate change may include:</b></p> <ul style="list-style-type: none"> <li>carbon pricing increasing costs, affecting purchase of basic health necessities:<sup>xxx</sup> <ul style="list-style-type: none"> <li>nutritious foods - potential health risks, e.g. protein deficiencies where meat is not replace with another protein source</li> <li>domestic energy prices - affecting use of heating and cooling devices, leading to temperature-related health risks (eg hypothermia in cold winters)</li> <li>fuel for transport - leading to                             <ul style="list-style-type: none"> <li>isolation, especially for rural populations</li> </ul> </li> </ul> </li> </ul> <p>reduced opportunities, e.g. to find or conduct paid employment, to see friends and family</p>	<p><b>Inequality may be widened due to:</b></p> <ul style="list-style-type: none"> <li>Disadvantaged groups suffering disproportionately from price rises, where better-off groups can afford to pay more<sup>xxxi</sup></li> <li>Better-off groups may be better at ensuring a healthy diet, when adapting to low-carbon living, and therefore less susceptible to dietary deficiencies<sup>xxxii</sup></li> <li>Better-off groups responding more rapidly and effectively to information campaigns aimed at changing behaviour<sup>xxxiii</sup></li> </ul>
<p><b>EFFECTS OF ADAPTATION</b></p>	<p><b>Potential negative impacts on health:</b></p> <ul style="list-style-type: none"> <li>More efficient use of water required<sup>xxxiv</sup></li> <li>Diet<sup>xxxv</sup></li> <li>travel opportunities<sup>xxxvi</sup></li> <li>employment patterns<sup>xxxvii</sup></li> <li>housing arrangements<sup>xxxviii</sup></li> <li>planting dates, crop variety and location, land management; e.g. erosion control and soil protection<sup>xxxix</sup></li> </ul>	<p><b>Inequality may be increased, where disadvantaged groups lack resources to:</b><sup>xl</sup></p> <ul style="list-style-type: none"> <li>adapt homes to weather extremes<sup>xli</sup></li> <li>pay for comprehensive insurance cover<sup>xlii</sup></li> </ul>

## Appendix 2: Health impacts of climate change

### References

---

- <sup>i</sup> UV light causing skin cancer and cataracts, see Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)
- <sup>ii</sup> Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)
- <sup>iii</sup> IPCC, Climate change 2007: Synthesis report of 4<sup>th</sup> assessment. Geneva: Intergovernmental Panel on Climate Change; 2007, p.53.
- <sup>iv</sup> Increased rainfall leading to increased numbers of bacteria in surface water, affecting drinking water in the UK, see Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)
- <sup>v</sup> Increased rainfall leading to increased numbers of bacteria in surface water, affecting drinking water in the UK. Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)
- <sup>vi</sup> Department of health report (2008) *op cit* concludes that outbreaks of malaria are likely to remain rare in the UK, although there is higher risk in other European countries see also Stern N, The Economics of Climate Change; The Stern review. HM Treasury, 2006. p. 76.
- <sup>vii</sup> Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)
- <sup>viii</sup> Stern N (2006) Stern review on the economics of climate change. Chapter 5: Costs of climate change in developed countries. Cambridge: Cambridge University Press; European Environment Agency (2004). Impacts of Europe's changing climate: An indicator-based assessment. Copenhagen: European Environmental Agency; IPCC, Climate change 2007: Synthesis report of 4<sup>th</sup> assessment. Geneva: Intergovernmental Panel on Climate Change; 2007, p.48.
- <sup>ix</sup> Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)
- <sup>x</sup> Stern N (2006) Stern review on the economics of climate change. Chapter 5: Costs of climate change in developed countries. Cambridge: Cambridge University Press.
- <sup>xi</sup> The effect of the summer 2007 floods on individuals and communities. Chapter 2 in Pitt M, [The Pitt Review: Lessons learned from the 2007 floods](#). The Cabinet Office, June 2008.
- <sup>xii</sup> The effect of the summer 2007 floods on individuals and communities. Chapter 2 in Pitt M, [The Pitt Review: Lessons learned from the 2007 floods](#). The Cabinet Office, June 2008.
- <sup>xiii</sup> Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)
- <sup>xiv</sup> IPCC, Climate change 2007: Synthesis report of 4<sup>th</sup> assessment. Geneva: Intergovernmental Panel on Climate Change; 2007, p.53.  
"Adults whose homes were flooded had four times more psychological distress than those with unaffected homes" - Chartered Institute of Environmental Health (2008) Climate Change, Public Health and Health Inequalities, p32  
Available at: [www.cieh.org/library/Policy/Publications\\_and\\_information\\_services/Policy\\_publications/Climate\\_Change\\_Public\\_Health\\_Health\\_Inequalities.pdf](http://www.cieh.org/library/Policy/Publications_and_information_services/Policy_publications/Climate_Change_Public_Health_Health_Inequalities.pdf)
- <sup>xv</sup> IPCC, Climate change 2007: Synthesis report of 4<sup>th</sup> assessment. Geneva: Intergovernmental Panel on Climate Change; 2007, p.53.
- <sup>xvi</sup> "The poorest in developed countries will be the most vulnerable to climate change." Stern N, The Economics of Climate Change; The Stern review. HM Treasury, 2006. Part II, chapter 5, p. 10.
- <sup>xvii</sup> IPCC, Climate change 2007: Synthesis report of 4<sup>th</sup> assessment. Geneva: Intergovernmental Panel on Climate Change; 2007, p.53.
- <sup>xviii</sup> Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702)

## Appendix 2: Health impacts of climate change

---

<sup>xix</sup> Stern N, The Economics of Climate Change; The Stern review. HM Treasury, 2006., [part II, chapter 5, p. 12. OR PART II, p 74??](#)

<sup>xx</sup> UNFPA (2001), The State of World Population 2001, available from: <http://www.unfpa.org/swp/2001/docs/swp2001eng.pdf>, (p.45): “Environmental factors have a direct effect on individuals’ reproductive health and communities’ response to reproductive health conditions. They also affect service access and quality. They have their most serious impacts among the poor, who are more likely to live near sources of pollution and use polluted resources.”

<sup>xxi</sup> Environment Agency (2006): ‘Addressing environmental inequalities: flood risk’, Bristol: Environment Agency.

<sup>xxii</sup> SDC (2008) “Health, place and nature”, available from: [http://www.sd-commission.org.uk/publications/downloads/Outdoor\\_environments\\_and\\_health.pdf](http://www.sd-commission.org.uk/publications/downloads/Outdoor_environments_and_health.pdf) (p.14): “The UK Low Income Diet and Nutrition Survey 2007 found that the nutrient intake for men, women and girls in deprived areas was lower than in other areas. Only 51 per cent reported having enough of the kinds of food they wanted to eat. The main reason cited for not always having the desired kinds of food was not having enough money. Poor availability or quality of food in local shops and difficulty in getting to the shops were also common reasons.”

<sup>xxiii</sup> The effect of the summer 2007 floods on individuals and communities. Chapter 2 in Pitt M, [The Pitt Review: Lessons learned from the 2007 floods](#). The Cabinet Office, June 2008.

<sup>xxiv</sup> Reducing the urban heat island effect can reduce energy requirements, as well as increasing communities’ resilience to heatwaves.

Chapter 8, *Human Health*, in: Parry ML, Canziani OF, Palutikof JP et al Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK.

<sup>xxv</sup> (Stern 2006, part II, p.1).

<sup>xxvi</sup> (Stern 2006, part II, p.1).

<sup>xxvii</sup> In the context of floodings: Department of Health and Health Protection Agency (2008) The Health Effects of Climate Change in the UK [www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_080702](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_080702) (p.26)

And

Chartered Institute of Environmental Health (2008), “Climate Change, Public Health and Health Inequalities. A resource for environmental health practitioners”, available from: [http://www.cieh.org/library/Policy/Publications\\_and\\_information\\_services/Policy\\_publications/Climate\\_Change\\_Public\\_Health\\_Health\\_Inequalities.pdf](http://www.cieh.org/library/Policy/Publications_and_information_services/Policy_publications/Climate_Change_Public_Health_Health_Inequalities.pdf) (p.11)

<sup>xxviii</sup> (Stern 2009, p.70)

<sup>xxix</sup> Stern N. (2009) Blueprint for a Safer Planet: How to Manage Climate Change and Create a New Era of Progress and Prosperity, The Bodley Head, p.70

<sup>xxx</sup> Chartered Institute of Environmental Health (2008), “Climate Change, Public Health and Health Inequalities. A resource for environmental health practitioners”, available from: [http://www.cieh.org/library/Policy/Publications\\_and\\_information\\_services/Policy\\_publications/Climate\\_Change\\_Public\\_Health\\_Health\\_Inequalities.pdf](http://www.cieh.org/library/Policy/Publications_and_information_services/Policy_publications/Climate_Change_Public_Health_Health_Inequalities.pdf) (p.7)

“In other words the health impacts of climate change will – perversely, unjustly and inequitably – affect those in our society who are most disadvantaged and who arguably have contributed least to it – certainly in terms of their consumption of natural resources. One example of this is the rapid and exponential price rise in commodities such as fuel and food. The reasons behind these are fundamentally linked to the developed world’s insatiable hunger for fossil fuels – and the drive to find ‘greener’ alternatives to what is ultimately an infinite natural resource in the form of oil. It is very likely that we will see increasing numbers of people in our society in both food and fuel poverty as a result of this along with the adverse health effects that often follow.”

<sup>xxxi</sup> Chartered Institute of Environmental Health (2008), “Climate Change, Public Health and Health Inequalities. A resource for environmental health practitioners”, available from: [http://www.cieh.org/library/Policy/Publications\\_and\\_information\\_services/Policy\\_publications/Climate\\_Change\\_Public\\_Health\\_Health\\_Inequalities.pdf](http://www.cieh.org/library/Policy/Publications_and_information_services/Policy_publications/Climate_Change_Public_Health_Health_Inequalities.pdf) (p.14): “Even without global food shortages it is virtually certain that increasing food prices, coupled with other increasing vital daily living costs such as energy and water, will see increasing numbers of vulnerable people in the British Isles facing life threatening poverty whether that be food, fuel, or both.”

<sup>xxxii</sup> Food Standards Agency (2007), Low income diet and nutrition survey. Summary of key findings”, available from: <http://www.food.gov.uk/multimedia/pdfs/lidnssummary.pdf> (p. 17): “In general terms, the low income population was less likely to consume: • Wholemeal bread • Vegetables... They tended to consume more: • Fat spreads and oils

## Appendix 2: Health impacts of climate change

---

(including, for example, reduced fat spread, not polyunsaturated) • Non-diet soft drinks • Beef, veal, lamb and pork and dishes • Pizza (except males aged 19-64 years) • Processed meats (children and adults aged 19-64 years) • Whole milk (children and adults aged 19-64 years) • Table sugar (all sex and age groups except women aged 65 years and over).”

<sup>xxxiii</sup> Environment Agency (2006), Addressing Environmental Inequalities: Flood Risk, available from:

[http://geography.lancs.ac.uk/envjustice/downloads/SC020061\\_SR1%20report%20-%20inequalities%20%20flood%20risk.pdf](http://geography.lancs.ac.uk/envjustice/downloads/SC020061_SR1%20report%20-%20inequalities%20%20flood%20risk.pdf)

<sup>xxxiv</sup> The water industry response to climate change. 26 September 2007. Water UK. Available at [www.water.org.uk/home/news/archive/climate-change/-01-10-2007?s1=climate&s2=change](http://www.water.org.uk/home/news/archive/climate-change/-01-10-2007?s1=climate&s2=change) (accessed 20 May 2009).

<sup>xxxv</sup> SDC (2008) “Health, place and nature”, available from: [http://www.sd-commission.org.uk/publications/downloads/Outdoor\\_environments\\_and\\_health.pdf](http://www.sd-commission.org.uk/publications/downloads/Outdoor_environments_and_health.pdf) (p.13): “The International Obesity Taskforce similarly states that, although certain individuals are genetically more susceptible to obesity, the major causes of obesity for the majority of the population are environmental; they blame the ‘toxic environment’ – that which simultaneously restricts mobility and stimulates high energy intake.”

<sup>xxxvi</sup> SDC (2008) “Health, place and nature”, available from: [http://www.sd-commission.org.uk/publications/downloads/Outdoor\\_environments\\_and\\_health.pdf](http://www.sd-commission.org.uk/publications/downloads/Outdoor_environments_and_health.pdf) (p.19): “Transport systems designed to promote active travel, such as cycling and walking, could reap the additional benefits of increasing physical activity, reducing the risk of obesity, reducing morbidity from air pollution and reducing the risk of road traffic accidents.”

<sup>xxxvii</sup> SDC (2008) “Health, place and nature”, available from: [http://www.sd-commission.org.uk/publications/downloads/Outdoor\\_environments\\_and\\_health.pdf](http://www.sd-commission.org.uk/publications/downloads/Outdoor_environments_and_health.pdf) (p.21): “[well-being] is enhanced by conditions that include supportive personal relationships, strong and inclusive communities, good health, financial and personal security, rewarding employment, and a healthy and attractive environment”

<sup>xxxviii</sup> Ibid.

<sup>xxxix</sup> IPCC 2007, p.57

<sup>xi</sup> “The poorest in developed countries will be the most vulnerable to climate change.” Stern N, The Economics of Climate Change; The Stern review. HM Treasury, 2006. Part II, chapter 5, p. 10.

<sup>xii</sup> IPCC, Climate change 2007: Synthesis report of 4<sup>th</sup> assessment. Geneva: Intergovernmental Panel on Climate Change; 2007, p.52 “Some systems, sectors and regions are *likely* to be especially affected by climate change. [...] [Example:] human health in populations with low adaptive capacity.

<sup>xiii</sup> The effect of the summer 2007 floods on individuals and communities. Chapter 2 in Pitt M, ‘The Pitt Review: Lessons learned from the 2007 floods’. The Cabinet Office, June 2008. Available at: [http://archive.cabinetoffice.gov.uk/pittreview/\\_media/assets/www.cabinetoffice.gov.uk/flooding\\_review/chapter\\_2%20pdf.pdf](http://archive.cabinetoffice.gov.uk/pittreview/_media/assets/www.cabinetoffice.gov.uk/flooding_review/chapter_2%20pdf.pdf)