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Urban governance of climate change and health: A literature review

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Abstract: Climate change creates additional threats to existing health problems in developing countries. Among the most likely health problems due to climate change are increased incidences of water and vector-borne diseases due to more frequent flooding and higher temperature in such countries. A wide literature exist that documents and discusses the effects of climate change on health. This working paper reviews the literature on climate change and health with a particular focus on identifying the literature that discusses the governance aspects in linking climate change adaptation and mitigation to health in urban areas in developing countries.

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Preface

This NIBR working paper reviews the literature on climate change adaptation, mitigation and health in urban areas in developing countries with a particular focus on governance aspects. The research team makes three observations: Firstly, the literature on climate change and health related to/in urban areas is discussed as part of the broader and established research issue of environmental health; secondly, there are potential co-benefits in treating climate change and health together; thirdly, equity issues are of concern to many authors.

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Oslo, January 2013

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Summary

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Climate change creates additional threats to existing health problems in developing countries. Among the most likely health problems due to climate change are increased incidences of waterborne and vector-borne diseases due to more frequent flooding and higher temperature in such countries. A wide range of literature exists that documents and discusses the effects of climate change on health. This working paper reviews the literature on climate change and health with a particular focus on identifying the literature that discusses the governance aspects of linking climate change adaptation and mitigation to health in urban areas in developing countries.

Three main observations emerge from the literature review. The first observation is that the literature on climate change and health related to/in urban areas is discussed as part of the broader and established research issue of environmental health. The second observation is that several of the relevant articles found in this search discussed the potential co-benefits of treating climate change and health together. The third observation is that the aspect of equity appears frequently in the literature linking climate change (or the broader issue of environmental health) to urban areas and health.

1 Introduction

Climate change creates additional threats to existing health problems in developing countries. There is now a wide range of literature that documents and discusses the effects of climate change on health^{1 2}. Costello et al.³ (2009) documented that more than 10 000 articles exist on this issue in developed and developing countries. The health effects of climate change⁴ range from ‘cardiovascular mortality and respiratory illnesses due to heat waves, to altered transmission of infectious diseases and malnutrition from crop failures’⁵.

Many of the health effects of climate change are predicted to be most acute in urban areas developing countries as warmer climate increases the spread of vector-borne and waterborne diseases that spread more rapidly in congested urban areas, such as when flooding occurs in informal settlements. The health effects of climate change in urban areas have most notably been linked to the heat island effect, indoor and outdoor air pollution, coastal location, high population density and poor sanitation⁶. The heat island effect, for instance, ‘will inevitably increase the risk of heatwaves and heatstrokes in cities in developing countries’⁷. Health problems due to increased precipitation are likely to affect poor people in developing countries the most as they live in areas prone to climate changes. Despite these effects of climate change on

¹ See e.g. Parham PE, Michael E: Modeling the effects of weather and climate change on malaria transmission. *Environmental Health Perspectives* 2010, 118 (5): 620-6; Bush KF, Luber G, Rani S, Kotha RS, Dhaliwal, Kapil V, Pascual M, Brown DG, Howard Frumkin H, Dhiman, RC, Hess J, Wilson ML, Balakrishnan K, Eisenberg J, Kaur T, Richard Rood R, Batterman S, Joseph A, Gronlund CJ, Agrawal A, Hu H: Impacts of Climate Change on Public Health in India: Future Research Directions. Review. *Environmental Health Perspectives* 2009, 119: 765-770.

² The UN Intergovernmental Panel on Climate Change’s Fourth Assessment Report projects several health impacts of climate change that are also listed in other articles. In particular, several scholars have engaged in debate on the possible effect of climate change on malaria.

³ Costello A, Abbas M, Allen A, Ball S, Bell S, Bellamy R, Friel S, Groce N, Johnson A, Kett M, Maria Lee, Caren Levy, Mark Maslin, David McCoy, Bill McGuire, Hugh Montgomery, Napier D, Pagel C, Patel J, Antonio J, de Oliveira P, Redclift N, Rees H, Rogger D, Scott J, Stephenson J, Twigg J, Wolff J, Patterson C. Managing the health effects of climate change. *Lancet* 2009, 374: 1693-773.

⁴ Articles discussing climate change and health in general include for instance Kovats S, Akhtar R: Climate, Climate change and human health in Asian cities 2008, *Environment and Urbanization* 20 (1): 165-175.

⁵ Patz JA, Campbell-Lendrum D, Holloway T, Foley JA (2005) Impact of regional climate change on human health. <http://www.ncbi.nlm.nih.gov/pubmed/16292302> *Nature* 2005, 438(7066) (Nov 17): 310-7, page cited: 310.

⁶ Campbell-Lendrum D, Corvalan C: Climate Change and Developing-Country Cities: Implications for Environmental Health and Equity *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 2007, 84 (1): i109-i117.

⁷ Costello et al., 2009: 16.

health, the work on climate change adaptation by the United Nations and governments has not paid sufficient attention to the health effects, with the exception of the World Health Organization (WHO). Likewise, global health work taking place in the countries that are most affected by climate change today and that are most vulnerable to its future health effects, has paid too little attention to climate change⁸.

Given that the problems and challenges are most likely to affect areas where global health initiatives and programmes are already established, some scholars have argued for the need to focus on the health effects of climate change in existing programmes and initiatives⁹. In general, St Louis and Hess¹⁰ argue that global health programmes should integrate and mainstream ‘global climate change mitigation and adaptation strategies’ into their programmes. Wiley,¹¹ from the point of global health, argues that ‘the global health advocacy community must become more engaged in the negotiation of key decisions that will be taken forward in coming years with regard to coordination of an international response to climate change and national-level implementation of international commitments’¹² This working paper aims to provide an overview of the existing literature on climate change and health with a focus on urban areas and the governance structures and mechanisms discussed in the literature reviewed. First, we outline the methods. Second, we present the findings from a literature review on climate change and health in relation to urban areas in developing countries. Finally, we provide some conclusions and point to the importance and relevance of this paper.

⁸ Wiley LF: Mitigation/Adaptation and Health: Health Policymaking in the Global Response to Climate Change and Implications for Other Upstream Determinants. *Journal of Law, Medicine & Ethics* 2010, Fall: 629-639, page cited: 632. St. Louis and Hess, 2008 St. Louis ME, Hess J: Climate Change. Impacts on and Implications for Global Health. *American Journal of Preventive Medicine* 2008, 35 (5): 527-538.

⁹ Wiley, 2010.

¹⁰ Wiley, 2010.

¹¹ Wiley, 2010.

¹² Wiley, 2011: 632.

2 Literature search and outputs

2.1 Literature search methodology

We searched for ‘climate’ AND ‘urban’ AND ‘health’ and then narrowed the search to ‘climate’ AND ‘urban’ AND ‘health’ AND ‘governance*’ in PubMed and the Social Science Citation Index. Although the working paper focuses on urban areas in developing countries, we did not limit the search to developing countries as most of the literature related to climate change and health concerns in developing countries. Furthermore, the reason we did not make this limitation was that we did not want to exclude studies that concerned both developing and developed countries. We also searched for ‘climate change’ and ‘health’ in combination with ‘government’, ‘governance’ and ‘responses’. The results are presented in the next chapter. On the basis of the results generated, we also reviewed a number of articles that had been quoted in the articles we found in order to pursue the themes discussed in the articles and to ensure a broader review of the literature. This was because we noticed that some of the key articles on climate change and health did not appear in the results list in the searches.

2.2 Outputs of literature search

The search on ‘climate’ ‘urban’ ‘health’ generated 1 692 results in PubMed. From the titles, we could tell that many were irrelevant as they focused on the physical environment of cities, on pollution, on mortality, on mental distress and other psychological factors. Some focused on cities in developed countries, such as Bambrick¹³. We found 37 articles that we believed to be relevant given our focus on climate and health in urban areas¹⁴. Several of these articles described problems in urban areas regarding climate change and health, but did not, however, suggest anything regarding governance. We then narrowed the search to ‘climate’ ‘urban’

¹³ Bambrick HJ, Capon AG, Barnett GB, Beaty RM, Burton AJ: Climate change and health in the urban environment: adaptation opportunities in Australian cities. *Asia Pac J Public Health* 2011, Mar 23(2 Suppl):67S-79.

¹⁴ E.g. Munslow B, O’Dempsey T Globalisation and climate change in Asia: the urban health impact. *Third World Quarterly* 2010, 31 (8): 339-356; Ramin BM, McMichael AJ: Climate change and health in sub-Saharan Africa: a case-based perspective. *Ecohealth* 2009Mar; 6(1): 52-7.

‘health’ ‘governance*’, which retained eight results, three of which were relevant for our study¹⁵.

We then put in the word ‘responses’ instead of ‘governance*’ and obtained 35 results. Several of these 35 articles were strictly technical, that is, about the effect of climate change on certain health problems such as allergy, heat-induced mortality etc. The search in the Social Science Citation Index generated 431 hits for articles on the combination of ‘climate’ ‘health’ ‘urban’. Seventeen articles were found to be relevant given our focus. Some of the articles that were found in the PubMed search also appeared in this search, such as articles on urban health equity. Adding ‘governance*’ to these words, we obtained ten hits.

We also searched for ‘climate change’ and ‘health’ in combination with ‘government’, ‘governance’, ‘responses’, ‘resilience’. These searches generated many of the same results and about ten articles¹⁶ were seen as relevant for our topic. In reading the relevant articles that focused on climate change, health and urban, we focused in particular on whether and how they discussed or launched ideas related to the governance of climate change adaptation, and resilience and health in urban areas.

¹⁵ Barten F, Akerman M, Becker D, Friel S, Hancock T, Mwatsama M, Rice M, Sheuya S, Stern R Rights, Knowledge, and Governance for Improved Health Equity in Urban Settings. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 2011, 88 (5) do:10.1007/s11524-011-9608-z; Capon AG, Synnott ES, Holliday S: Urbanism, climate change and health: systems approaches to governance. *New South Wales Public Health Bulletin* 2009, Jan-Feb; 20(1-2): 24-8; Friel S, Dangour AD, Garnett T, Lock T, Chalabi Z, Roberts I, Butler A, Butler CD, Waage J, Prof McMichael AJ, Haines A: Public health benefits of strategies to reduce greenhouse-gas emissions: food and agriculture. *Lancet* 2009, 374: 2016-2025.

¹⁶ Annex 1 lists these 10 articles.

3 Findings

Starting from a general point of climate change and health, Haines and McMichael¹⁷ provide an analysis of how climate change and health need to be integrated. Costello et al.¹⁸ provide ‘three health-sector strategies to manage the health sector effects of climate change-promotion of mitigation, tackling the pathways that lead to ill-health and strengthening health systems’¹⁹. The issue of health in climate change adaptation needs to be higher on the agenda globally and nationally. McMichael et al.²⁰ demonstrated that only a few of the reporting nations to COP 15 in Copenhagen mentioned health in their reports. There are three main observations from the relevant articles we found through this literature review. The first observation is that the literature on climate change and health related to/in urban areas is discussed as part of the broader and established research issue of environmental health. The second finding that emerged from the literature review is that several of the articles discussed the potential co-benefits of treating climate change and health together. The third finding generated from the literature review is that the aspect of equity appears frequently in the literature that links climate change (or the broader issue of environmental health) to urban areas and health. We present these three main findings in separate sections in this chapter.

3.1 Environmental health: a key approach

The first observation is that the literature on climate change, urban development/urban areas and health is discussed as part of the broader and established research issue of environmental health. In practice, too, environmental health seems to be the overarching area in which climate change is placed. The

¹⁷ Haines A, McMichael AJ, Smith KR, Roberts I, Woodcock J, Markandya A, Armstrong BG, Campbell-Lendrum DDangour AD, Davies M, Bruce N, Tonne C, Barrett M, Wilkinson P (2009) Public health benefits of strategies to reduce greenhouse-gas emissions: overviews and implications for policy makers. *Lancet* 2009, 374: 2104-2114.

¹⁸ Costello A, Maslin M, Montgomery H, Johnson AM, Ekins P: Global health and climate change: moving from denial and catastrophic fatalism to positive action. *Philosophical Transactions of the Royal Society A. Mathematical, Physical & Engineering Sciences* 2011, 369: 1866-1882.

¹⁹ Costello et al., 2009: 1866.

²⁰ McMichael AJ, Neira M, Bertollini R, Campbell-Lendrum D, Hales S: Climate change: a time of need and opportunity for the health sector. *Lancet* 2009, 374: 2132-2125.

literature on urban health, such as Kjellstrom et al.,²¹ treats climate change as part of the overall subject of environmental health. Treating climate change and its adaptation and mitigation efforts with regards to health under the umbrella of environmental health resonates well, we argue, with the need for a comprehensive approach in integrating health issues into climate change adaptation and mitigation.

3.2 Co-benefits of climate change and health

The second finding that emerged from the literature review is that several of the articles discussed the potential co-benefits of treating climate change and health together. Some of the articles on climate change, health and urban areas concerned the potential co-benefits²². As St. Louis et al.²³ argued, one element that is ‘particularly instructive for global health’ is ‘to reduce the indoor burning of biomass’²⁴. This use of biomass indoors is a major health problem in low-income countries as well as an important contributor to greenhouse gas emission in these countries²⁵.

St. Louis et al.²⁶ also mention heatwaves, the threat to many cities from being on the coast and vulnerable to ‘infrastructure damage from sea-level rise. as well as infiltration of saltwater into freshwater supplies’²⁷. Wiley²⁸ suggests that the global health community ‘might also play a role in pointing to potential co-benefits of measures in other sectors where non-point sources of GHG emissions have been neglected’²⁹ Furthermore, she stresses that the ‘global health community has a responsibility to inform, and as necessary, drive the process of setting an agenda for health adaptation’³⁰. She also proposes that to focus on the co-benefits of mitigation in reducing climate change and health ‘may help build political will for their adoption’³¹.

²¹ Kjellstrom T, Friel S, Dixon J, Corvalan C, Rehfuess E, Campbell-Lendrum D, Gore F, Bartram J Urban Environmental Health Hazards and Health Equity. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 2007, 84 (1): i86-i97.

²² E.g. Harlan SL, Ruddell DM: Climate change and health in cities: impacts of heat and air pollution and potential co-benefits from mitigation and adaptation. *Current Opinion in Environmental Sustainability* 2011, 3 (3): 126-134; Jack DW, Kinney PL Health co-benefits of climate mitigation in urban areas. *Current Opinion in Environmental Sustainability* 2010, 2 (3): 172-177; Haines A, Kovats RS, Campbell-Lendrum D, Corvalan C Climate change and human health: impacts, vulnerability, and mitigation. *Lancet* 2008, 367: 2101-9; Friel S, Dangour AD, Garnett T, Lock T, Chalabi Z, Roberts I, Butler A, Butler CD, Waage J, Prof McMichael AJ, Haines A: Public health benefits of strategies to reduce greenhouse-gas emissions: food and agriculture. *Lancet* 2009, 374: 2016-2025.

²³ St. Louis and Hess, 2008 St. Louis ME, Hess J: Climate Change. Impacts on and Implications for Global Health. *American Journal of Preventive Medicine* 2008, 35 (5): 527-538.

²⁴ St. Louis and Hess: 532.

²⁵ St. Louis and Hess: 532.

²⁶ St. Louis and Hess: 532.

²⁷ St. Louis and Hess: 531.

²⁸ Wiley, 2010.

²⁹ Wiley, 2010: 632.

³⁰ Wiley, 2010: 633.

³¹ Wiley, 2010: 633.

3.3 Urban governance and health: the key aspect of equity

The third finding generated from the literature review is that the aspect of equity appears frequently in the literature that links climate change (or the broader issue of environmental health) to urban areas and health³². Equity is a key issue addressed in this literature due to the inequity with regard to health in urban areas, particularly in the areas most vulnerable to climate change, i.e. poor urban areas in developing countries. Densely populated rural areas, as are found in parts of South Africa, are likely to be equally vulnerable. As ‘more than 70% of the urban population in sub-Saharan Africa live in slums’³³, the focus on climate change and health in African cities is particularly concerned with vulnerable and poor populations. Some scholars identify several ‘specific health vulnerabilities’ to climate change and argue in general that urban areas should be given more attention in terms of addressing the governance responses needed to adapt to and make cities resilient to the climate changes that are likely to come³⁴. However, several contributions discuss the dimension of health equity and also focus on *urban health equity* in particular, and climate change effect is seen as one of several environmental aspects that affect urban health.

Campbell-Lendrum et al.³⁵ review the specific health vulnerabilities in urban areas in developing countries. Common vulnerability factors are the heat island effect, indoor air pollution, coastal location, high population density and poor sanitation. Several of the waterborne and vector-borne diseases- ‘are strongly influenced by climate conditions, and several are common within cities’³⁶. Several of the environmental health effects are more prevalent in urban than rural areas, and the environmental health aspects are discussed with particular regard to urban areas. A general aspect of equity that is echoed in several publications is that those most vulnerable to climate change and already affected by changes are those who have contributed least to greenhouse gases, i.e. children in developing countries. Kjellstrom et al.³⁷ suggest that urban areas are prone to inequity in environmental health, but also that they provide ‘opportunities for implementing interventions for health equity’³⁸.

³² E.g. Friel S, Hancock T, Kjellstrom T, McGranahan G, Monge, P, Roy J: Urban Health Inequities and the Added Pressure of Climate Change: An Action-Oriented Research Agenda. *Journal of Urban Health-Bulletin of the New York Academy of Medicine* 2011, 88 (5): 886-895.

³³ Yuen B, Asfaw K: Africa and Asia: Two of the World’s Fastest Growing Regions. In Yuen B, Asfaw K (eds.): *Climate change and sustainable urban development in Africa*, 2011: 1-13.

³⁴ Campbell-Lendrum D, Bertollini R, Neira M, Ebi K, McMichael A: Health and climate change: a roadmap for applied research. *Lancet* 2009, 373 (May 16): 1663-1664.

³⁵ Campbell-Lendrum D, Corvalan C: Climate Change and Developing-Country Cities: Implications for Environmental Health and Equity *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 2007, 84 (1): i109-i117.

³⁶ Campbell-Lendrum et al., 2007: i112.

³⁷ Kjellstrom T, Friel S, Dixon J, Corvalan C, Rehfuess E, Campbell-Lendrum D, Gore F, Bartram J: Urban Environmental Health Hazards and Health Equity. *Journal of Urban Health: Bulletin of the New York Academy of Medicine* 2007, 84 (1): i86-i97.

³⁸ Kjellstrom et al., 2008: i86.

Another contribution that touches upon climate change, health and urban areas, and addresses equity, is by Ebi et al.³⁹. They suggest that we should focus on what they call ‘human health vulnerability’ in order to find ways to mitigate and adapt to climate change. A human health vulnerability approach includes the following three elements: ‘a) sensitivity, b) exposure to climate-related hazard, c) ‘the adaptation measures and actions in place to reduce the burden of a specific adverse health outcome’⁴⁰. Then Ebi et al. (2006) ask: ‘What are main barriers to implementation (e.g. technology or political will)? What can be done now to reduce vulnerability?’ They argue that the impacts of implemented adaptation options in response to actual or projected climate change need to be evaluated in terms of potential adverse health effects⁴¹. Such an evaluation should include ‘lessons learnt from past public health policies, including the effectiveness of various measures, such as vector control and early warning systems’⁴².

Moreover, there are some contributions that discuss the aspect of equity and include some reflections on urban areas as well. For instance, Friel et al.⁴³ examine ‘the interface between climate change, social conditions, and health inequity’ and include discussion about urban areas. The authors further stress the need to change international and national policies. They further argue that there is a somewhat unclear relationship between achieving greater health equity and climate change adaptation, as ‘mitigation of climate change is a prerequisite for avoidance of a widening of health inequities’.

Meanwhile, adaptive responses to climate change, while necessary, are a less sure way of reducing health inequities, since self-interested adaptation by those populations with most resources would necessarily increase the health gap⁴⁴. They further propose a ‘Green Marshall Plan for global health equity’⁴⁵ which includes slum upgrading. They conclude that health and equity should be integrated into efforts to mitigate climate change, as efforts now also focus on transport, agriculture etc. They also point out that ‘food, nutrition and hunger link global health equity, poverty, and climate stabilisation agendas’⁴⁶.

Regarding the issue of urban areas, they suggest the establishment of a ‘healthy-cities model of urban governance’. Such a model should ‘include principles of equity and sustainability and could provide an integrated framework with which to redress this’⁴⁷. Moreover, they argue that ‘environmentally sustainable development, oriented to health equity, must ensure the supply of basic amenities, including water and

³⁹ Ebi et al., 2006.

⁴⁰ Ebi et al., 2006: 1931.

⁴¹ Ebi Kristi L, Kovats RS, Menne, B: An Approach for Assessing Human Health Vulnerability and Public Health Interventions to Adapt to Climate Change *Environmental Health Perspectives* 2006: page cited 1932.

⁴² Ebi et al., 2006: 1933.

⁴³ Friel S, Marmot M, Mc Michael, A J, Kjellstrom T, Vågerö D: Global Health equity and climate stabilisation: a common agenda *Lancet* 2008, 372: 1677-83.

⁴⁴ Friel et al., 2008: 1679.

⁴⁵ Friel et al., 2008: 1680.

⁴⁶ Friel et al., 2008: 1679.

⁴⁷ Friel et al., 2008: 1681.

housing⁴⁸. Anguelovski and Carmin⁴⁹ outline how various cities have established different institutional mechanisms for climate governance, some cross-cutting bodies and some particular bodies within environmental departments of central and local governments.

3.4 Need for more research on urban governance of climate change adaptation and health

The challenges for integrating health into the governance of climate change adaptation and mitigation efforts in urban areas are several and exist at different levels. One main challenge is the need for multi-level work across government levels and sectors. While mitigation efforts need to be addressed especially at the global and national levels, adaptation efforts need to take into account the specific urban context where efforts are to be pursued, addressing existing health inequity at the local level.

Another challenge is that some of the diseases/health problems that are likely to be exacerbated and spread to new areas due to climate change are diseases/problems that are not well addressed in the primary health-care system today⁵⁰. Hence, there is a two-fold challenge: integration of these existing vertical programmes into primary health care, and integration of all health programmes and the work on climate change adaptation. The challenges of coordination and harmonisation of programmes and priorities within the health sector are well known and widely discussed, and efforts have been underway to address these issues for some years at the global and national and local levels. However, despite consensus at the global level for coordination, the national and local efforts remain far from coordinated within the health sector, and thus the necessary cross-sectoral integration with climate change adaptive work is far off⁵¹.

Wiley⁵² states that climate change adaptation in the health sector and other sectors require both 'new legal tools' and 'new governance mechanisms for coordination among governmental and nongovernmental actors at the national, international and local levels'⁵³.

The University College of London Lancet Commission on climate and health came up with three areas of action and a framework that can guide these areas. The framework consists of five areas of work: informational, poverty and equity- related, technological, socio-political and institutional. It is the latter, the institutional, that is particularly pertinent to this paper. The institutional part of the framework refers to

⁴⁸ Friel et al., 2008: 1680.

⁴⁹ Anguelovski I, Carmin J Something borrowed, everything new: innovation and institutionalization in urban climate governance. *Current Opinion in Environmental Sustainability* 2011, 3: 169-175.

⁵⁰ Wiley, 2011.

⁵¹ Barten et al., 2009.

⁵² Wiley, 2011.

⁵³ Wiley, 2011: 636.

work for ‘greater coordination and accountability by governments and international institutions to address the health effects of climate change’⁵⁴

Moreover, Barten et al.⁵⁵ discuss governance as a concept in relation to the WHO Healthy cities project, and present a three-fold outline of the various aspects of urban governance: 1) scale is important, metropolitan regions that go beyond borders and levels are important - ‘supra-local facts and decisions taken by distant and powerful actors can have a profound impact on health inequity within as well as between cities’; 2) governance is ‘a dynamic process’ i.e. the shift from government to governance (few have, however, discussed the implications of this shift in evaluations of the healthy cities’; 3) the city is ‘a contested place’, where the ‘pursuit of urban health equity requires a form of joined-up governance that brings together the health sector and actors in other sectors of municipal, regional, and national governments, that engages with the private for-profit and private non-profit groups’⁵⁶.

3.5 Global health and climate change adaptation

The case for action to reduce climate change is overwhelming and the global health threat from it is real and urgent⁵⁷. The global health landscape has shifted substantially over the last decade. Within the area of global health (that is, those diseases and health problems that are deemed global and have therefore received increased attention and funding in recent years), St. Louis et al.⁵⁸ demonstrate that the linkages have not been made clear and that the efforts within global health should be more substantially linked to the climate change adaptation efforts. They propose ‘a collaborative learning initiative’ to promote such collaboration at the programmatic level as well as on the evidence base that links ‘climate effects and health’. As St. Louis et al.⁵⁹ point out, ‘many of the most pressing global health concerns are affected directly or indirectly by climate variability and change’. The many actors within global health have made positive impacts in terms of addressing infectious diseases and providing treatment for many people. Nevertheless, the upsurge in actors and funding available for global health issues have also increased low-income countries’ transaction costs as they have to deal with several different actors, all of whom require different reporting procedures, plans etc.

3.6 Multi-level dimensions of governance related to climate change and health in urban areas

Bai et al.⁶⁰ (2010) argue that there is an ‘inherent temporal, spatial and institutional mismatch between urban policies and regional and global environmental issues’. The

⁵⁴ Wiley, 2011: 1870.

⁵⁵ Barten et al., 2011.

⁵⁶ Barten et al., 2009: 898-900.

⁵⁷ Costello et al., 2011: 1878.

⁵⁸ St. Louis et al., 2008.

⁵⁹ St. Louis et al., 2008: 529.

⁶⁰ Bai et al. (2010)

authors further argue that cities need to learn from each other to address these issues and that networking is key to this. Furthermore, Barten et al.⁶¹ argue that ‘a conceptual framework of governance and its interrelation with governability is still lacking, and there is a need to understand what participatory urban governance means in theory and practice across different contexts’⁶². In addition, Costello et al.⁶³ point out that more research on urban context is needed to ‘deepen the understanding of equivalent strategies adopted by poor people in the urban context. There has been some focus on climate resilience in urban planning’.

They further state that a new governance system is needed at all levels. In such a governance system, ‘climate change policies should not be self-contained but need transversal responses integrated with other policies (e.g. housing, health, and poverty reduction), and policy responses and efforts vertically (at the different levels of governance) and horizontally (within the structure of government, and with civil society, NGOs, and the private sector)’⁶⁴. They further suggest that ‘joined-up government’ is needed to integrate health into the climate change adaptation work.

Barten et al.⁶⁵ (2009) put forward similar reflections, arguing that there is little knowledge of ‘the interface between national and local government/governance and the impacts of “whole-of-government” approach to improve health equity’⁶⁶ (ibid.: 902). Moreover, they stress that 1) local populations should ‘participate in decision-making processes’; 2) ‘local political will is needed to develop institutional capacity to create strong public health systems’; 3) ‘coordination at different levels of governance is necessary to distribute resources and expertise for adapting to climate change in human settlements and its health consequences’⁶⁷. The political challenge is to ‘create governance structures that combine top-down and bottom-up approaches to change health governance structures towards efficient and fair processes and outcomes’⁶⁸.

The institutional challenge is ‘coordination with a vertical and horizontal dimension’⁶⁹. ‘Coordination should form joined-up governments’⁷⁰. At the global level, the governance problem is that ‘global governance is characterised by a lack of

⁶¹ Barten et al., 2011

⁶² Barten et al., 2011: 902.

⁶³ Costello et al., 2009

⁶⁴ Costello et al., 2009: 48.

⁶⁵ Barten et al., 2009.

⁶⁶ The terms ‘joined up government’/‘whole of government’ basically imply the same: horizontal coordination of government units in order to manage a joint problem/challenge (Bogdanor, 2005) . This term stems from the public sector reform agenda that has been advocated over the past ten years in industrialised democracies and refers to the focus on more horizontal coordination to make up for the vertical specialisation of the public sector. The establishment of government agencies in addition to ministries as public sector organisations within the state constitute one example of such vertical specialisation. Such vertical specialisation created fragmentation of tasks within the public sector. See e.g. Christensen T and Lægreid P (2008) The Challenge of Coordination in Central Government Organizations: The Norwegian Case. *Public Organization Review* 8: 97-116.

⁶⁷ Barten et al., 2009: 41.

⁶⁸ Barten et al., 2009: 41.

⁶⁹ Barten et al., 2009: 43.

⁷⁰ Barten et al., 2009: 43

democratic accountability and profound inequalities⁷¹. At the national level, there are three challenges that need to be addressed: 1) 'reduction of carbon-emitting activities need to be managed', 2) 'locally relevant adaptation technologies that do not compromise growth need to be identified', and 3) 'health effects of climate change need to be integrated into national plans across sectors and tiers of government'⁷².

None of the contributions reviewed all these elements in detail or reflected upon the governance measures and structures needed to handle the health effects of climate change in urban areas in developing countries from a perspective emerging from the theoretical literature on governance and coordination. Winswold et al.⁷³ provide such a theoretical point of departure for discussing the problem of lack of coordination in urban planning and development. They argue that this lack of coordination may pose a problem for adaptation to climate change. Moreover, these scholars argue that the transfer of knowledge and action can be seen as complex problems of coordination. Therefore their contribution combines theory on governance modes and organisational learning to discuss this argument and to show the opportunities and challenges for knowledge transfer and action with regard to adaptation in urban planning and development, depending on what governance mode is used. The three governance modes are hierarchy, network and market. The article suggests that actual coordination does not correspond to each type per se, but is often a mix of these.

⁷¹ Barten et al., 2009: 43

⁷² Barten et al., 2009: 43

⁷³ Winswold M, Stokke KB, Klausen JE, Saglie IL Organizational learning and governance in adaptation in urban development. In: Agder N, Lorenzoni I and O'Brien K (eds). *Adapting to Climate Change: Thresholds, Values, Governance* Cambridge: Cambridge University Press, 2009.

4 Conclusions

4.1 Four considerations for policy makers working on climate change and health in urban settings

Summing up the literature, we argue that there are four elements to consider in urban governance of climate change adaptation that seeks to include health effects of climate change. These four elements should be considered by policy makers working on climate change and health in urban settings in developing countries:

- 1) What structures/actors need to be involved.
- 2) How the governing actors involve manage to coordinate across actors representing different sectors.
- 3) How the multilevel dimension to this coordination is maintained, balancing the local variation in exposure to and effects of climate change on health and, subsequently, different urban governance responses of climate change adaptation that includes health.
- 4) How the equity aspect in this work is maintained across sectors and levels of government as well as across the spectrum of actors involved.

4.2 Main conclusions

This working paper has reviewed the literature on climate change, health (including global health) and urban areas. A substantial body of knowledge exists on the health effects of climate change. Three findings emerged from the literature review on climate change, health and urban areas. The first finding is that the literature on climate change, health and urban areas is discussed as part of the broader and established research issue of environmental health. The second finding is that a substantial number of contributions focus on the potential co-benefits of addressing health problems in conjunction with climate change adaptation. The third finding is that the aspect of equity appears frequently in the literature that links climate change (or the broader issue of environmental health) to urban areas and health.

Furthermore, by reviewing the literature, we found that it has not sufficiently addressed how one should best govern in urban areas to ensure that the health effects of climate change are addressed and that climate change adaptation efforts include health. Thus, this working paper has demonstrated that there is still a gap in research on how to govern the health effects of climate change in urban areas in

developing countries. To point to this gap in research is relevant in order to address the need for more research on this topic.

Summarising the literature, the paper came up with four suggestions that policy makers should consider in urban governance of climate change adaptation that seeks to include health effects of climate change: 1) what structures/actors need to be involved; 2) how they coordinate across actors representing different sectors; 3) the multilevel dimension to this coordination and, subsequently, the urban governance of climate change adaptation that includes health; 4) the equity aspect of this work.

Annex 1:

The ten articles most relevant to the study

Bambrick HJ, Capon AG, Barnett GB, Beaty RM, Burton AJ: Climate change and health in the urban environment: adaptation opportunities in Australian cities. *Asia Pac J Public Health* 2011, Mar 23(2 Suppl):67S-79.

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Capon AG, Synnott ES, Holliday S: Urbanism, climate change and health: systems approaches to governance. *New South Wales Public Health Bulletin* 2009, Jan-Feb; 20(1-2): 24-8.

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Munslow B, O'Dempsey T Globalisation and climate change in Asia: the urban health impact. *Third World Quarterly* 2010, 31 (8): 339-356; Ramin BM, McMichael AJ: Climate change and health in sub-Saharan Africa: a case-based perspective. *Ecohealth* 2009 Mar; 6(1): 52-7.