

Urban climate risks

and the role of social protection

Short Case Studies

Authors: [Stephen McDowell](#), [Sayanti Sengupta](#), [Sujoy Natson](#) and [Cecilia Costella](#)

This brief gives an overview of different country case studies where social protection (SP) systems have been used to address risks arising from climate-related hazards in urban spaces. It also explores how the existing SP systems in Tanzania, Bangladesh and Ethiopia could be modified, given adequate resources, to become shock responsive. This is the second brief in the ‘Urban climate risks and the role of social protection’ series. The first brief, which provides an introduction to different climate-related hazards in urban areas and the role of SP in alleviating the impacts, can be found [here](#).

Climate-related hazards impact urban environments and result in risks that are diverse in nature, magnitude, and scale – creating challenges unique to each urban setting (UN Habitat 2011). There is a dynamic relationship between climatic events, urbanization and human activity. The impacts of a climatic event can be worsened due to the presence and concentration of economic activities (such as the increased exposure due to the built-up infrastructure of city centres) or as a result of human action or inaction (such as the inadequate maintenance of drainage systems or building on flood plains.) (UNDESA 2010). These factors sometimes act as catalysts for destruction, even more than the climatic event itself. The complex inter-relationship between human activities and climatic hazards determines who is exposed and susceptible to an event and the degree to which they can manage the consequences. Additionally, structural inequalities play a significant role in determining resource allocation building adaptive capacity for the most vulnerable. As these groups are less likely to pay into formal social security schemes, they are often the ones neglected when prioritizing development efforts.

Nature of urban risks: Most urban climate risks are idiosyncratic ¹ apart from the particularly extreme catastrophic events that are covariate in nature (e.g. Beira, Mozambique was 90 per cent destroyed by torrential rain and flooding due to Cyclone Idai in 2019; or Typhoon Haiyan – one of the most powerful tropical cyclones ever recorded – which devastated large swathes of South East Asia in 2013). A single event will have varying levels of severity and magnitude across urban areas, depending on their exposure and coping

¹ Idiosyncratic risks are those risks experienced by a particular individual or an individual household and are typically unrelated to neighbouring households’ experience, like job loss or sickness. Covariate risks refer to the experiences where many households in the same geographical location suffer from the same experience, like natural disasters and political crisis.

capacity. Regular hazards with low levels of risk but repeated occurrence may result in recurring expenses for individuals – particularly those from poor households. Since low-level but regularly occurring risks are not classed as ‘humanitarian’, external support for these incidents is mostly unavailable. But as these incur important economic costs to individuals, businesses and municipal governments, comprehensive SP policies, managed and delivered by national governments, are necessary.

Social protection’s role in addressing vulnerability to urban climate risks

In recent years, there has been increased attention given to the ways in which SP programmes can play an important role in protecting poor and vulnerable people from climate-related risks. In particular, social safety nets (SSN)², a type of SP programme, are considered to have great potential as they provide vulnerable people – who do not have sufficient support or lose their incomes suddenly – with assistance in a sustained manner over a long-term, unlike emergency assistance.

For instance, when a shock is imminent, SSN programmes can protect vulnerable populations by providing assistance right before or immediately after the shock. For example, the beneficiaries of Mexico’s conditional cash transfer programme Progresa were better able to absorb weather related shocks; while the Kenyan Hunger Safety Net Programme has a shock responsive component built into its conditional cash transfer programmes that can reach out to additional households, thus making the programmes flexible and scalable in times of need (Ulrichs et al. 2019). Not only do these programmes help people to come out of poverty and transform their lives and livelihoods, they can also help in building people’s adaptive capacity by reducing their vulnerability to climate shocks and enhancing their ability to cope with climate risks in the long term. An example of this is the public works programme – a special type of SP instrument – which is often combined with cash transfers. Also known as a cash for work

Cash distribution in Noakhali district, Bangladesh for Cyclone Mora, 29 May 2017 (Photo: Muhammad Mamtaz Uddin/DRK)



programme, it encourages the building of climate-resilient infrastructure, such as flood houses that are used for shelter in flood-prone regions. This can reduce the vulnerability and exposure of a population to floods and reduce the impacts. But while it is evident that SP instruments along with efforts from individuals and communities can collectively address and manage diverse levels of risk related to a single climate event in rural areas, the role of SP for urban climate risks has remained under-explored. A few cases where SP instruments have been used in urban areas for climate-related risks are listed in the box, below.

2 SSN assistance can be in the form of cash or in-kind provision, based on meeting certain prerequisites or unconditionally awarded.

Box 1: Examples of social protection instruments used for urban climate risks³

- In UK, the [Cold Weather Payment](#) is a safety net programme operating nationally, that disburses cash transfers to vulnerable households in anticipation of cold weather. The money received allows households to pay for their heating costs during winter. This reduces the household's vulnerability to extreme temperature events through preventive measures that build coping capacity.
- For different climate-related risks from floods and cyclones, and for both urban and rural areas, the **Vulnerable Group Development Programme** in Dhaka, Bangladesh has been ramped up to extend coverage to 10 million households instead of the two million regular recipient households. The programme, targeted at vulnerable women, improves access to microfinance and provides recipients with skills training (Coirolo *et al.* 2013). Thus, both elements of the programme can have a positive impact on improving people's adaptive capacity.
- In the aftermath of tropical cyclone Winston in 2016, the Fijian government disbursed cash to vulnerable households using three existing SP schemes: the **Poverty Benefit Scheme, Social Pension Scheme, and Care and Protection Scheme**. Top-ups and house-building assistance were also provided. The Fiji National Provident Fund, which is the largest social insurance programme in Fiji, permitted its members to withdraw cash within a week of the cyclone, which helped improve outcomes by injecting much-needed cash into the economy (Mansur *et al.* 2019).

Given that evidence of using SP schemes for urban climate risks is limited, the following section uses case studies to explore how a few of the existing schemes in different contexts can be useful in providing: i) response; ii) mitigation; iii) avoidance; and iv) transformation.

The three case studies are from Addis Ababa, Dar es Salaam and Dhaka, with a specific hazard from each city. The hazards were chosen based on their climatic consequences, spatial coverage and the likelihood of them becoming extreme events. From these climatic dimensions, consequences – such as severity and magnitude – for different urban groups were assessed. The levels of risk arising from each hazard were used as a problem statement against which we considered how SP instruments could be effective.

Heatwaves in Dar-es-Salaam, Tanzania

Urban areas, in general, are particularly vulnerable to heatwaves due to the compounding urban heat island effect – the phenomenon in which manmade urban areas are significantly warmer than the surrounding rural areas (Leal Filho *et al.* 2017). In Dar es Salaam, evidence from some climate model analysis suggests that temperatures during the day and nights will rise (Luhunga *et al.* 2018), with an increase in heatwaves (Capuano *et al.* 2013). Urbanization in Dar es Salaam accelerates extreme temperatures and increases people's vulnerability to those temperatures. This is expected to disproportionately impact its large, poor segment of the population, predominantly in the

³ While these instruments were not exclusively used for urban areas, the examples here give an idea on how vulnerable groups in urban areas can also be covered using SP, which has so far traditionally been targeted at rural households.

form of financial losses (increased expenditure, decreased income), and public health challenges such as illness requiring medical attention as well as higher levels of mortality (Pasquini *et al.* 2020) .

Role of SP: Given the potential and probable consequences of heatwaves, an SP approach might have the objective to: ensure the prompt treatment of those who need medical care; address inequities which may impede poorer or more vulnerable people from adapting their homes to reduce household temperatures; and address inequities that entrench people in poverty and life in slums which are more susceptible to high temperatures.

Dar es Salaam
Rodger Shija/Pixabay



Social protection instrument	Current role	Potential role in heatwaves
Universal health care	<p>Response: Primary healthcare, referral healthcare</p> <p>Mitigation: Sending health-related messages</p>	<p>Response: Case finding (patients vulnerable due to pre-existing conditions); distribution of homebased treatments (i.e. rehydration)</p> <p>Mitigation: Advance public health messaging with heat alerts</p>
Support to persons with disabilities	<p>Response: Cash payments can enable access to treatment</p>	<p>Mitigation: Tailored public health advice; advance payments to ensure access to healthcare; advance payments to use air conditioners, or other means of reducing heat in homes</p>
Urban productive safety net programme	<p>Mitigation: Cash payments can be used to help families improve thermal conditions in the home or to seek emergency medical care</p>	<p>Response: Future wage guarantee for those unable to work or where work is reduced during a heatwave</p> <p>Transformation: Environmental improvements (tree planting, rooftop/wall gardens, public spaces, improved water and sanitation) to reduce the effect of human activity on increasing temperatures; greening of urban heat islands</p>
Municipal public works	<p>Mitigation: Creation of urban infrastructure and assets</p>	<p>Mitigation: Painting roofs white to reduce heat within houses, other community structures that might be useful for informal settlements</p>
Universal education scheme	<p>Avoidance: Education and skills to help children move out of poverty and live in improved housing and sections of the city</p>	<p>Mitigation: Assistance for students who might temporarily discontinue schooling due to extreme heat; improving cooling in schools; deferring tests or specific activities until after the heatwave; improving access to food and water at schools/homes; provision of transport services for day scholars</p>
Social development subsidy	<p>Mitigation: Subsidies for construction and social welfare projects</p>	<p>Mitigation: Incentives to invest in heat-resistant roofs, improved ventilation, etc.</p>



Bogra, Bangladesh during 2016 monsoon flood
Olaf Neussner/German Red Cross

Floods in Dhaka, Bangladesh

Flooding in Dhaka, one of the most populated cities in South Asia, is best understood as a regular event. While rarely resulting in extreme outcomes, floods have caused direct damage to infrastructure and property as well as loss of life (Hammond *et al.* 2015) and have impacted negatively on people's incomes due to their inability to work or because of public health risks (Hammond *et al.* 2015; Taylor *et al.* 2013). The urban setting in Dhaka, with its many informal settlements situated in previously low-lying agricultural lands or water bodies (Dewan and Yamaguchi 2009), such as alluvial or sandy soils, exacerbates exposure to these hazards. Flooding occurs annually and these informal settlements, in particular, are affected for days and weeks at a time. In response, roads have been raised and houses have been built on stilts and designed to be dismantled during floods.

These informal settlements are found throughout the city, wherever there is space available; and are often under-served by proper sanitation or sewage facilities. Flood events damage physical property, residential buildings, transport vehicles and telecommunication and electric, and result in other indirect impacts like loss of income due to the inability to continue with regular economic activities (Dasgupta *et al.*, 2015). For the poor, the main consequence of seasonal flooding is the hardship that must be endured, including short-term displacement and loss of assets or income. Variations in seasonal morbidity or mortality have also been observed and are understood to occur as the result of prolonged exposure to flood waters and living in very damp, unhygienic conditions.

Role of SP: Bangladesh has a complex system of SP, with [136 social safety nets](#) administered by various government agencies, including the Ministry of Disaster Management and Relief (MoDMR). A National Mechanism for Loss and Damage to address climate impacts is also being designed by the MoDMR (Natson and Bahlman 2018). Given the potential and probable consequences of floods, SP might build on the government’s broadly coordinated efforts to help poorer families avoid flood losses.

Social protection instrument	Current role	Potential role in floods
Urban primary healthcare services delivery project	<p>Response: Primary healthcare, referral healthcare</p> <p>Mitigation: Health messaging</p>	<p>Response: Access subsidy Ambulatory care</p> <p>Mitigation: Extend public health messaging into informal/unrecognized areas</p> <p>Access to subsidized rehydration liquids/Water purification technologies</p>
Urban-based marginal women development project		<p>Mitigation: Investment or savings schemes to help women move into formal settlements</p>
Vulnerable group development	<p>Mitigation: Improved incomes to manage flood impacts more effectively</p>	<p>Response: Increased payments for flood affected beneficiaries – incurring exceptional seasonal costs (health or housing related)</p>
Pro-poor slum integration	<p>Mitigation: Improved housing, including design, to manage modest flooding</p>	<p>Mitigation: Extend assistance to new arrivals</p> <p>Transformation: Help the poorest people move to formal settlements and register for benefits</p>
Municipal public works	<p>Mitigation: Improved urban infrastructure</p>	<p>Mitigation: Improved drainage and flood protection infrastructure in informal/unrecognized settlements</p>
Universal education	<p>Transformation: Investing in developing human capital to promote long-term benefits and improve poverty outcomes</p>	<p>Mitigation: Collaboration across Ministries of Education and Social Services to keep children living in informal/unrecognized settlements in school during the flood seasons</p> <p>Transformation: Suite of actions to have children living in informal/unrecognized settlements attending school</p>

Droughts in Addis Ababa, Ethiopia

While an entire urban area might be exposed to heat, micro-pockets of higher temperatures within cities are sometimes created due to the absence of trees, impediments to airflow/wind and/or swamps/high humidity. Informal settlements in badly ventilated and congested areas have been growing in Addis Ababa, where about 51 per cent of the economically active labour force is employed in largely non-permanent, low-skill jobs, such as daily manual labour or similar trades. Land use and land cover patterns have been altered due to urbanization and deforestation and have contributed to droughts. The city is exposed to high risks from hydrological droughts as the Awash River – the most important river basin in Ethiopia and the main source of urban water supply from 100 kilometres away – has been drying up due to lack of rainfall, environmental destruction in the river catchment and unsustainable levels of water abstraction. Additionally, meteorological droughts that occur more regularly inland, can also have impacts on temperatures in Addis Ababa. An agricultural drought outside of Addis Ababa can also impact food prices or food availability (Paavola 2008), power supply (Economics of Climate Adaptation 2009), or urban water supply.

Role of SP: Given the potential direct and indirect consequences of droughts, SP approaches might play a role in: supporting urban water supply systems; stabilizing prices and food shortages; and minimizing losses or reducing costs to protect jobs.



Social protection instrument	Current role	Potential role in droughts
Urban safety net programme	Response: Cash transfer to meet price hikes	Response: Adaptive provision to cover price hikes Mitigation: Include information dissemination on food options and food supplements
Productive safety net programme	Response: Regular cash transfers and public works component for vulnerable households	Mitigation: Extend coverage to urban areas to cover urban poor; provide labour component to widen efforts to recover Addis Ababa's water catchment area for continued water supply
Micro & small enterprises support	Response: Support for small-scale businesses and entrepreneurs	Response: Adaptive mechanism in case of price hikes i.e. freeze loan repayments; additional support for women-led businesses Mitigation: Planning to manage periods of depressed revenue; formal savings mechanisms; strategies of purchase/storage
Universal education	Transformation: Development of human capital to promote long term benefits and improve poverty outcomes	Response: Complementary programme components, including free school meals to discourage dropouts during droughts Transformation: Use education for teaching ways to conserve water, problems from over extraction, need for protecting river catchments, and engaging in eco-friendly behaviour

As described above, urban climate risks vary in nature and severity, and different SP instruments can be valuable, particularly where there is potential to influence behaviours. SP can be useful to transform conditions and prevent risk and mitigate the level of risk or, at least, better enable people to manage it.

However, not every action requires investment by SP instruments, nor is SP the most appropriate instrument for some urban climate risks. The provision of cash as an emergency response may, in some instances, be helpful, but it is not an SP action.

A few key challenges to keep in mind while considering SP for urban climate risks are:

- 1.** Often, when informal settlements are not recognized, they may not get assistance from municipal authorities.
- 2.** Daily migrants are not documented, meaning that daily wage labourers may lose income to floods in their urban workplaces, but may not get relief as they are not included in city registries.
- 3.** Investing in SP bears fruit in the long-term, which may not coincide with electoral cycles and, therefore, may lack support from political actors.
- 4.** SP insurance schemes may not be appropriate for most informal workers in urban areas.
- 5.** The impression that rural areas are more vulnerable than urban areas can undermine anticipatory efforts by actors.
- 6.** Financing will remain a big challenge for SP in urban areas; however, the possibility of including the private sector in this regard should be explored.
- 7.** Poverty in urban and rural areas looks different and manifests in different ways, so merely exporting SP schemes used in a rural context to be used in a city can result in disadvantages.

Decisions to use SP to avoid, mitigate or manage impacts of urban climate risks should be commensurate with the consequences of the hazard and complementary to other urban economic and development priorities. But given that the most regularly occurring consequences of urban climate hazards are likely to be economic, well-designed safety nets delivering regular cash transfers that can promote saving and productive investments, can prevent groups from slipping into poverty. While urban planning and management can climate-proof a city's infrastructure, SP schemes can supplement it by extending coverage to the city's residents.

References

- Capuano, P., Sellerino, M., Di Ruocco, A., Kombe, W. and Yeshitela, K. 'Climate change induced heat wave hazard in eastern Africa: Dar Es Salaam (Tanzania) and Addis Ababa (Ethiopia) case study' in *Geophysical Research Abstracts*, Vol. 15, EGU2013-3366, presented at the EGU General Assembly, 2013. <https://meetingorganizer.copernicus.org/EGU2013/EGU2013-3366.pdf>
- Coirolo, C., Commins, S., Haque, I. and Pierce, G. 'Climate change and social protection in Bangladesh: Are existing programmes able to address the impacts of climate change?' in *Development Policy Review*, Vol. 31 (s2), pp. 74–90, 2013. <https://doi.org/10.1111/dpr.12040>
- Dasgupta, S., Zaman, A., Roy, S., Huq, M., Jahan, S., & Nishat, A. (2015). Urban Flooding of Greater Dhaka in a Changing Climate: Building local resilience to disaster risk. *World Bank Publications*. <https://openknowledge.worldbank.org/handle/10986/22768>
- Dewan, A.M. and Yamaguchi, Y. 'Using remote sensing and GIS to detect and monitor land use and land cover change in Dhaka Metropolitan of Bangladesh during 1960–2005' in *Environmental Monitoring and Assessment*, Vol. 150, 237, 2009. <https://doi.org/10.1007/s10661-008-0226-5>
- Economics of Climate Adaptation (ECA). *Shaping climate-resilient development: A framework for decision-making*. A report of the Economics of Climate Adaptation Working Group, 2009. http://ccsl.iccip.net/climate_resilient.pdf
- Hammond, M.J., Chen, A.S., Djordjević, S., Butler, D. and Mark, O. 'Urban flood impact assessment: A state-of-the-art review' in *Urban Water Journal*, Vol. 12(1), pp.14–29, 2015. <https://doi.org/10.1080/1573062X.2013.857421>
- Leal Filho, W., Echevarria Icaza, L., Emanche, V.O. and Quasem Al-Amin, A. 'An evidence-based review of impacts, strategies and tools to mitigate urban heat islands' in *International Journal of Environmental Research and Public Health*, Vol. 14(12), pp. 1600, 2017. <https://doi.org/10.3390/ijerph14121600>
- Luhunga, P.M., Kijazi, A.L., Chang'a, L., Kondowe, A., Ng'ongolo, H. and Mtongori, H. 'Climate change projections for Tanzania based on high-resolution regional climate models from the Coordinated Regional Climate Downscaling Experiment (CORDEX)-Africa' in *Frontiers in Environmental Science*, Vol. 6, p. 122, 2018. <https://doi.org/10.3389/fenvs.2018.00122>
- Mansur, A., Doyle, J. and Ivaschenko, O. *Social protection and humanitarian assistance nexus for disaster response: Lessons learnt from Fiji's Tropical Cyclone Winston*. Social Protection & Labor Discussion Paper No. 1701, 2017. Washington, DC: World Bank. <https://openknowledge.worldbank.org/handle/10986/26408>
- Natson, S and Bahlman L.A. 'Damaged and lost?' in *Dhaka Tribune*, 30 December 2018. <https://www.dhakatribune.com/tribune-supplements/tribune-climate/2018/12/30/damaged-and-lost>
- Paavola, J. 'Livelihoods, vulnerability and adaptation to climate change in Morogoro, Tanzania' in *Environmental Science & Policy*, Vol. 11 (7), pp. 642–654, 2008. <https://doi.org/10.1016/j.envsci.2008.06.002>
- Pasquini, L., van Aardenne, L., Godsmark, C. N., Lee, J. and Jack, C. 'Emerging climate change-related public health challenges in Africa: A case study of the heat–health vulnerability of informal settlement residents in Dar es Salaam, Tanzania' in *Science of The Total Environment*, Vol. 747, 141355, 2020. <https://doi.org/10.1016/j.scitotenv.2020.141355>
- Taylor, J., Biddulph, P., Davies, M. and man Lai, K. 'Predicting the microbial exposure risks in urban floods using GIS, building simulation, and microbial models' in *Environment International*, Vol. 51, pp.182–195, 2013. <https://doi.org/10.1016/j.envint.2012.10.006>
- Ulrichs, M., Slater, R. and Costella, C. 'Building resilience to climate risks through social protection: from individualised models to systemic transformation' in *Disasters*, Vol. 43(53), pp. S368–S387, 2019. <https://doi.org/10.1111/disa.12339>
- United Nations Department of Economic and Social Affairs (UNDESA). *World urbanization prospects: the 2009 revision*, 2010. http://81.47.175.201/ET2050_library/docs/scenarios/WUP2009.pdf
- United Nations Human Settlements Programme (UN Habitat). *Global report on human settlements 2011: Cities and climate change*, 2011. <https://unhabitat.org/global-report-on-human-settlements-2011-cities-and-climate-change>
- UN Habitat. *State of the world's cities 2008/9: Harmonious cities*, 2008. <https://unhabitat.org/state-of-the-worlds-cities-20082009-harmonious-cities-2>

The findings and conclusions in this brief are those of the authors alone and do not necessarily reflect the views of the Red Cross Red Crescent Climate Centre, the IFRC or its National Societies.