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# Climate change and social development

Topic guide

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Cover: Meenakshi Dewan, one of four women in her village in Orissa, India trained in solar power engineering (Abbie Trayler-Smith / Panos Pictures / DFID)

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# Summary

What is the impact of climate change on social development goals? How can social development analysis and interventions reduce vulnerability to climate change and improve people's resilience and adaptive capacity?

Climate change is fundamentally a social development issue. The impacts of a changing climate – including increases in extreme weather events and rising temperatures – are acute and multi-dimensional, already affecting vulnerabilities, resilience and social inequities globally, and placing lives and livelihoods at risk. There is a consensus in the literature that climate change will have far-reaching consequences for social development goals and economic development more broadly, including poverty reduction, food and nutrition security, economic growth, gender equality, social equity, and health (FAO, 2016). Moreover, causes and consequences of climate change are linked to global patterns of inequality and social justice. Evidence indicates that climate change impacts are not borne equally – demographic and socioeconomic factors such as gender, age, livelihood strategies and poverty shape levels of exposure to climate change effects, vulnerability and resilience (Ribot, 2010; Lambrou & Nelson, 2010; Skinner, 2011).

This Topic Guide synthesises literature on the links between climate change and social development, and includes evidence of their interactions, lessons, approaches and tools. It considers climate change impacts and climate-relevant interventions in the following areas:

- *five sectors*: agriculture and food security, health, water, energy, and low-carbon transport;
- *three types of contexts*: conflict-affected and insecure settings, urban settings, and coastal zones;
- *two key social development strategies*: social protection and Disaster Risk Reduction (DRR).

Climate change is threatening the resilience of societies and communities worldwide and increasing existing vulnerabilities, particularly where people's livelihoods rely on natural resources and ecosystems. Consideration of climate change in investment programme design, particularly investments with strong social development aspects, is vital in tackling its potentially adverse impacts (Dubois et al., 2012).

Social development, and specifically social analysis, is important to integrate into climate change programme design and implementation because it provides the perspectives and methods essential for understanding the dynamic processes of vulnerability and resilience in response to climate change contexts. Social analysis – including use of vulnerability assessments in particular – is essential to understand why specific individuals, households and/or communities may experience differences in impacts, and the implications of climate change effects on differing groups and their livelihoods (FAO, 2011; 2016).

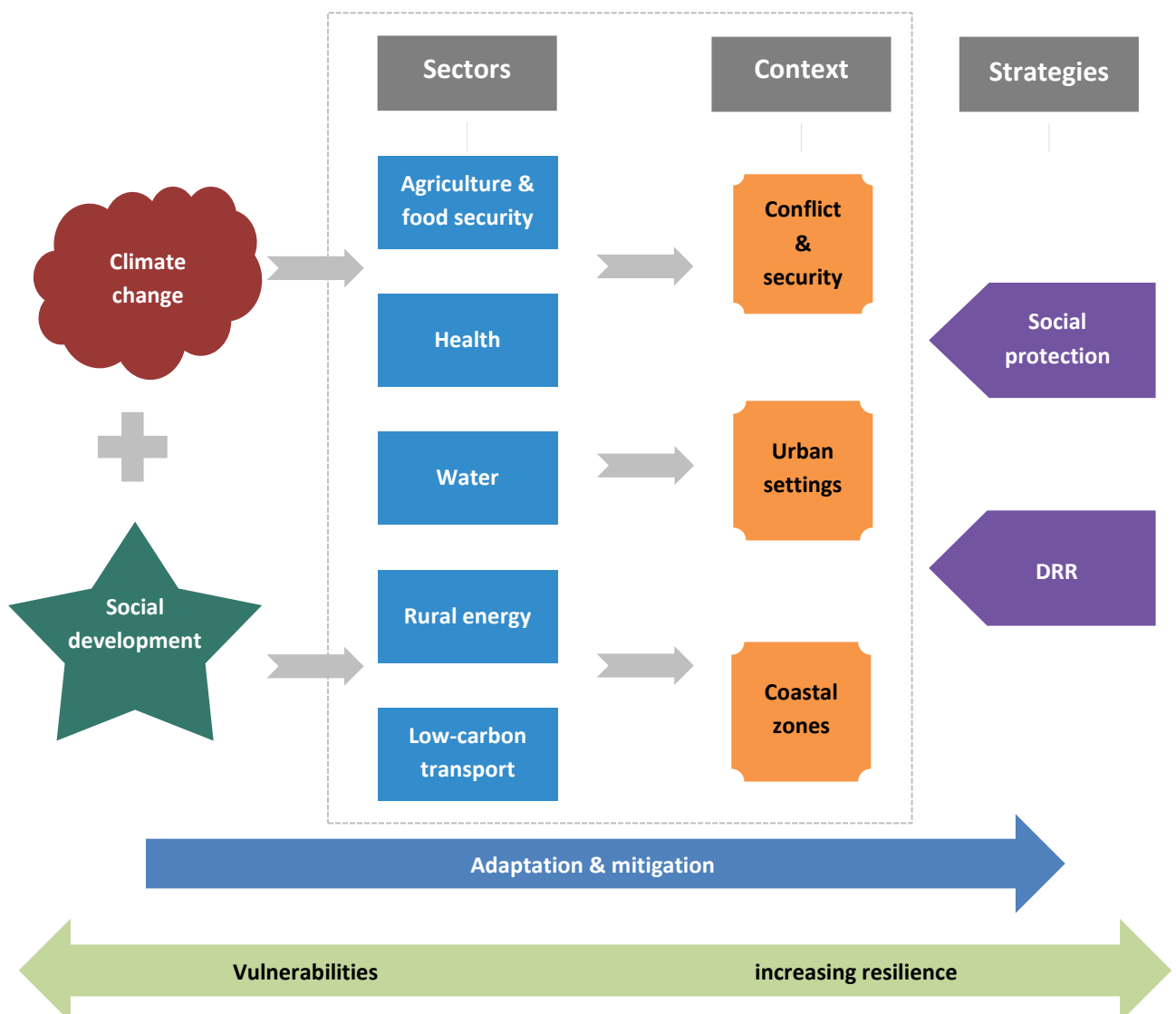
Both urban and rural areas will face new and more severe challenges arising from climate change. Resource depletion and agricultural sector impacts may be severe, affecting production levels, food security, incomes and livelihoods (HLPE, 2012; FAO, 2013). Changes in water levels and temperatures and increasing water scarcity will affect both rural populations whose livelihoods depend on water ecosystems (e.g. fishing communities), and people in urban areas. Further, resource scarcity combined with community adaptation responses (e.g. pastoral migrations) and emerging mitigation measures may provoke or heighten tensions and conflict (Bernauer et al., 2013). Urban areas are often vulnerable to disaster risk due to high population density, poor quality infrastructure and inadequate planning and risk management (Baker, 2012; Satterthwaite et al., 2007). Health and well-being will be affected as climate change increases levels of disease (such as malaria), malnutrition and psychological stress (Confalonieri et al., 2007).



Social protection can reduce vulnerability to climate change by improving household resilience, including coping strategies and adaptive capacities (FAO, 2015). Integrating approaches such as disaster risk reduction (DRR) with climate change adaptation has also had positive results (Davies et al., 2013).

A main message of this Topic Guide is that using social analysis approaches and tools in climate change programming is vital for deepening understanding of vulnerability and adaptive processes – this will improve the design and effectiveness of climate-relevant interventions (Dubois et al., 2012; FAO, 2011). Inclusive, participatory, people-centred methods and tools that examine contextual factors in a holistic perspective are recommended. These include vulnerability assessments, gender analysis, poverty and social impact analysis, and institutional analysis.

### Climate change and social development: Topic Guide structure



# 1. Understanding climate change as a social development issue

## 1.1. What is climate change?

The Intergovernmental Panel on Climate Change (IPCC) defines climate change as ‘a change in the state of the climate that can be identified (for example by using statistical tests) by changes in the mean and/or the variability of its properties and that persist for an extended period, typically decades or longer’ (IPCC, 2007). Effects of climate change include: increasingly erratic weather patterns; more frequent extreme weather events (such as droughts, tropical storms and floods); and longer-term stresses, such as rises in temperature and sea levels (ILO et al., 2011). Climate change has cascading impact chains from physical features to people, with social and economic consequences affecting livelihoods and food and nutrition security (FAO, 2016). While much attention is given to extreme weather events, the less dramatic, slow and incremental impacts of climate change are equally important in their cumulative impact on human well-being (Moser et al., 2010).

**Adaptive capacity** refers to the ‘ability or potential of a system to respond successfully to climate variability and change’.<sup>1</sup> Adaptive capacities include preventative strategies, which involve making decisions to minimise or avoid an event, and strategies to facilitate recovery. Research has highlighted that adaptive capacities are interrelated, and no single factor is likely to account for the degree of reduced vulnerability and increased resilience in any given context.

Transmission of climate stress may be increased or reduced by the specific **vulnerabilities** at each level of the system. If households face repeated shocks that steadily erode their assets, vulnerability is likely to increase as **resilience** erodes over time (FAO, 2016). Vulnerability depends on both physical and social dimensions – a social vulnerability lens is therefore essential to understand why certain individuals, households or communities experience impacts differently, even when they are in the same location (FAO, 2016).

### Key terms and definitions

**Adaptation:** ‘adjustments to reduce vulnerability or enhance resilience in response to observed or expected changes in climate and associated extreme weather events. Adaptation occurs in physical, ecological and human systems. It involves changes in social and environmental processes, perceptions of climate risk, practices and functions to reduce potential damages or to realise new opportunities’ (IPCC, 2007).<sup>2</sup>

**Mitigation:** ‘ability to diminish the intensity of the natural (and other) stresses to which it might be exposed. Since this definition suggests that a group’s capacity to mitigate hinges on the severity of impacts, capacity may be defined as “a country’s ability to reduce anthropogenic greenhouse gases or enhance natural sinks’ (IPCC, 2007).<sup>3</sup>

**Resilience** is the capacity of systems (and communities, households, individuals) to prevent, mitigate or cope with risks/shocks and recover. A system is resilient when it is less vulnerable to shocks over time, enabling recovery by adaptation (FAO, 2013).

**Vulnerability** is the propensity to be adversely affected by shocks; it is a complex issue incorporating various dimensions. It is useful to consider vulnerability of ‘what’ to ‘what’ (FAO, 2013). Structural and situational factors in a given context largely determine vulnerability (Mearns & Norton, 2010).

<sup>1</sup> See: [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg2/en/ch18s18-6.html](http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch18s18-6.html)

<sup>2</sup> See: [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg2/en/ch17s17-1.html](http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch17s17-1.html)

<sup>3</sup> See: [http://www.ipcc.ch/publications\\_and\\_data/ar4/wg2/en/ch18s18-6.html](http://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch18s18-6.html)

The following documents present a range of interpretations of concepts and terms related to climate change identified in UN and national climate change reports, and in development and academic literature:

- UNFCCC. (1992). *Text of the United Nations Framework Convention on Climate Change*. Bonn: United Nations Framework Convention on Climate Change. <http://unfccc.int/resource/docs/convkp/conveng.pdf>
- IPCC. (2007). *Climate change 2007: Synthesis report*. Geneva: Intergovernmental Panel on Climate Change. [http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4\\_syr.pdf](http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf)
- Combaz, E. (2014). *Disaster resilience: Topic guide*. Birmingham, UK: GSDRC, University of Birmingham. [http://www.gsdrc.org/docs/open/gsdrc\\_dr\\_topic\\_guide.pdf](http://www.gsdrc.org/docs/open/gsdrc_dr_topic_guide.pdf)
- Brooks, N., Anderson, S., Ayers, J., Burton, I., & Tellam, I. (2011). *Tracking adaptation and measuring development* (Climate Change Working Paper 01). London: IIED. <http://pubs.iied.org/10031IIED.html>
- FAO. (2013). *Climate-smart agriculture sourcebook*. Rome: FAO. <http://www.fao.org/3/a-i3325e.pdf>
- Mearns, R., & Norton, A. (Eds.). (2010). *Social dimensions of climate change: Equity and vulnerability in a warming world*. Washington, DC: World Bank. <http://hdl.handle.net/10986/2689>

## 1.2. Integration of climate change and social development in programme design: the rationale

Consensus among experts is that climate change will have far-reaching consequences for development, poverty eradication and food and nutrition security (Mearns & Norton, 2010; FAO, 2016). There is a broad body of literature exploring the scientific dimensions of climate change (see IPCC, 2007, 2014), and growing attention is being paid to its social and economic impacts (ILO et al., 2011; Mearns & Norton, 2010). As yet, however, there are no agreed international indicators of the effects of climate change on social development goals. An example of possible indicators is provided by a study led by FAO in six Sub-Saharan African countries. This measured climate change impacts on household welfare indicators, including total income, agricultural income, consumption levels, and food security. Findings showed that the most vulnerable households were most adversely affected by climate hazards, such as decreased rainfall (FAO, 2016).

Despite this, experts broadly assert that integrating consideration of climate change into social development programming is vital to tackle impacts it may have on the achievement of social development goals. Climate change impacts include multiplying and perpetuating existing vulnerabilities, disproportionately affecting people living in poverty, and rolling back hard-earned gains in poverty reduction (ILO et al., 2011; IPCC, 2014).

Likewise, integrating a social development perspective into climate change adaptation and mitigation programmes can improve the design and implementation of climate change response measures while promoting social development goals. By applying robust **social analysis** in climate change programme design it is likely that more effective interventions will be incorporated to improve adaptive capacities (ILO et al., 2011; IPCC, 2014; FAO, 2011). The social analysis lens can also be useful in emphasising issues of equity, social justice and engagement – including among countries globally, and among the more marginalised and vulnerable population groups such as indigenous peoples and women (Means & Norton, 2010). In the long run, supporting climate change adaptation is likely to be less costly than inaction: adaptation is a cost-effective strategy (FAO, 2011).

**Mearns, R., & Norton, A. (Eds.). (2010). *Social dimensions of climate change: Equity and vulnerability in a warming world*. Washington, DC: World Bank. <http://hdl.handle.net/10986/2689>**

Drawing from multi-method research, this volume analyses vulnerabilities to climate change and assesses strategies of adaptation through a social development and social equity perspective. A main theme is combining climate change measures with social development and sustainability goals. It covers issues including the impacts of climate change on migration, gender dimensions of poverty and adaptation, the role of indigenous knowledge in crafting adaptation efforts, impacts on drylands, and urbanisation. The volume emphasises inclusion and social justice, with attention to engagement of the poor and more vulnerable populations.

**IPCC. (2014). *Climate change 2014: Impacts, adaptation and vulnerability – Summary for policymakers*. Geneva: IPCC. [http://ipcc-wg2.gov/AR5/images/uploads/IPCC\\_WG2AR5\\_SPM\\_Approved.pdf](http://ipcc-wg2.gov/AR5/images/uploads/IPCC_WG2AR5_SPM_Approved.pdf)**

How are patterns of risks and potential benefits shifting due to climate change? This report from the IPCC assesses a large knowledge base of scientific, technical, and socioeconomic literature. It covers: observed impacts, vulnerability and exposure, and adaptive responses to date; future risks and potential benefits; and principles for effective adaptation. A particular focus on risk highlights the interaction between climate-related hazards and the exposure and vulnerability of ecosystems and human systems. Adaptation to future climate change must start with reducing vulnerability and exposure to present climate variability and increasing resilience by improving human well-being and environmental quality.

**ILO, UNDESA, & WHO. (2011). *The social dimensions of climate change: Discussion Draft*. New York: UN Task Team on Social Dimensions of Climate Change. <http://www.who.int/globalchange/mediacentre/events/2011/social-dimensions-of-climate-change.pdf>**

This report represents a collective effort by 20 UN agencies to map out the benefits of addressing social dimensions in climate change policies. People are both threatened by, and agents of, climate change. Social processes including demographic change, consumption and production are key drivers of climate change and response measures depend on people to be successful. There are also major synergies between action on climate change and wider sustainable development and human rights agendas. Local-level social impact assessments are advocated to identify socioeconomic climate change 'hotspots'. Designers of climate response measures need to pay extra attention to safeguarding the interests of the most vulnerable.

### **1.3. Understanding vulnerability to climate change**

Both demographic and socioeconomic factors affect vulnerability to climate change. It is widely asserted that the poor will be hardest hit by the impacts of climate change, especially those whose livelihoods are most heavily dependent on natural resources. Vulnerability is a complex and dynamic concept. It depends on many contextual factors and system components, such as environmental, social, cultural, economic and institutional factors and livelihood strategies. Typically, more vulnerable groups are those with fewer assets and less access to means of coping with and adapting to climate risks (FAO, 2016, 2013). The poor, women, and indigenous peoples are often particularly vulnerable as they have limited access to assets, services, networks and land, and may face a range of constraints to improving their livelihoods and building resilience (e.g. social norms, policy, inadequate legislation such as lack of land rights, limited access to services, and limited agency and engagement in public decision-making) (Ribot, 2010). Some experts advocate including **power relations** in understanding vulnerability, characterising vulnerability in three forms: physical vulnerability, politico-legal vulnerability, and socioeconomic vulnerability (Moser et al., 2010).



Recommended tools to identify and understand dynamics of vulnerability include vulnerability assessments, social risk management and asset-based assessments, and the sustainable livelihoods framework. The latter particularly identifies how assets and the institutional and policy environment shape resilience. These tools can help in designing interventions that are well-tailored to context and targeted to those most in need (Heltberg et al., 2008; FAO, 2011; 2016).

**Heltberg, R., Jorgensen, S. L., & Bennett Siegel, P. (2008). *Climate change, human vulnerability, and social risk management*. Washington, DC: World Bank.**

[http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/SDCCWorkingPaper\\_SRM.pdf](http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/SDCCWorkingPaper_SRM.pdf)

Risks associated with climate change could increase household vulnerability to poverty, hunger, disease, mortality, displacement and conflict in many developing countries. This paper sets out a social risk management framework to help design interventions to increase society's capacity to manage climate risks so as to reduce households' vulnerability and maintain or increase opportunities for development.

**Ribot, J. (2010). *Vulnerability does not fall from the sky: Toward multi-scale pro-poor climate policy*. In R. Mearns & A. Norton (Eds.) *Social dimensions of climate change: Equity and vulnerability in a warming world*. Washington, DC: World Bank. <http://hdl.handle.net/10986/2689>**

This chapter examines vulnerability as a structural issue and calls for evaluation of the relatively neglected social and political-economic drivers of vulnerability. It focuses on the reduction of everyday vulnerabilities of poor and marginal groups exposed to climate trends, and suggests that policy can significantly reduce climate-induced vulnerabilities among the poor. Analysis of the causes of vulnerability is fundamental to this process.

## **Demographic and cultural factors affecting vulnerability**

### ***Gender***

Men and women experience climate change differently. Because of the existing **gender division of labour and roles based on social norms**, women have different tasks and responsibilities from men, have a different knowledge base, face different risks and have different access to climate response strategies. Men and women have different access to information, technologies, services and support due to sociocultural normative inequalities which typically leave women at a disadvantage (Lambrou & Nelson, 2010). Women's primary care role in the household often means they feel the effects of climate change keenly – walking further for water and food due to climate-related resource scarcity, or having to care for relatives impacted by climate-related disease (Skinner, 2011). Higher rates of illiteracy and a lack of access to information about climate change can increase their exposure to risk and ability to respond (Skinner, 2011). Gender inequalities in the **distribution of assets** and limited access to financial capital often mean women cannot easily diversify their livelihoods (Skinner, 2011). There is also evidence of the differential impact of climate change on men's and women's **health** (WHO, 2014), and concerns that women are less likely to survive **natural disasters** and may be placed at increased risk of sexual violence in a post-disaster context (Plan International, 2011; UNDP, 2009).

Despite being among the most vulnerable to climate change, and broadly excluded from international climate change policy, women and girls have a critical role in increasing the resilience and adaptive capacity of their communities. In particular, their expert knowledge of natural resources makes them well placed to take a lead in adaptation efforts (UNDP 2009). **Gender analysis** tools can be useful for identifying the differential impacts of climate change interventions on women and girls. They can help tailor interventions to ensure they are gender inclusive and that the voices of women and girls are included in decision-making processes at all levels (Lambrou & Nelson 2010; FAO, 2011).

**UNDP. (2009). *Resource guide on gender and climate change*. New York: UNDP.**  
<http://www.undp.org/content/dam/aplaws/publication/en/publications/womens-empowerment/resource-guide-on-gender-and-climate-change/Resource.pdf>

How are women and men affected differently by climate change, and how can international climate action take account of gender? This report reviews the literature on these questions, and includes an annotated bibliography and list of relevant international frameworks. Women are particularly vulnerable to climate change, for example in their roles as food producers and water collectors. But women can also play an important role in adaptation and mitigation, for example through leadership in natural resource management. Action is needed to document the differentiated impact of climate change on the quality of life of women and men, and to include explicit gender equality considerations in international climate change policies and action plans.

**Skinner, E. (2011). *Gender and climate change: Overview Report (BRIDGE Cutting Edge Pack)*. Brighton: BRIDGE/IDS.** [http://www.bridge.ids.ac.uk/vfile/upload/4/document/1211/Gender\\_and\\_CC\\_for\\_web.pdf](http://www.bridge.ids.ac.uk/vfile/upload/4/document/1211/Gender_and_CC_for_web.pdf)

What is the relationship between gender and climate change? This literature review identifies the gender dimensions of climate change and argues that gender considerations need to be at the centre of climate change policy. Many climate adaptation policies fail to account for the role and agency of women, despite women's often expert knowledge on the environment. A rights-based approach to climate change is advocated, which emphasises the agency and role of women in adaptation and mitigation.

## **Age**

### **Children**

Climate change will have significant generational impacts, affecting children disproportionately in both the immediate and long term (UNICEF, 2007). Children, particularly girls, are highly susceptible to disaster and health-related impacts of climate change, including an increase in the prevalence of malaria, undernutrition, and increases in sexual exploitation and violence in a post-disaster context (Plan International, 2011). Climate change impacts compound existing discrimination faced by girls, including lack of education and health care services, and the burden of paid and unpaid work (Plan International, 2011).

However, despite their vulnerability, children can play a **positive role in mitigation and adaptation** efforts. For instance, children can help communicate risks to their peers and relatives, and provide practical and creative ideas to help communities recover from disasters (Back et al., 2009). Children's awareness of the impacts of climate change, and how to mitigate them, is also crucial to sustaining development outcomes (Back et al., 2009). A rights-based perspective draws attention to children's issues in adaptation and emphasises that children should play a role in decisions that affect them.

**UNICEF. (2007). *Climate change and children*. Geneva: UNICEF.**  
[http://www.unicef.org/publications/index\\_42166.html](http://www.unicef.org/publications/index_42166.html)

This report provides a broad overview of the main ways that climate change affects children. Key themes considered are natural disasters, disease, water, food security, trees, and energy. The particular vulnerability of children in all these areas is emphasised – for example, they are affected most severely by natural disasters. While children and young people are affected most profoundly by environmental deterioration, they are also potentially the greatest agents of positive change. Instilling environmental awareness at a young age is an effective way to encourage protection and stewardship of the earth, hence increased investment is needed in environmental education.

**Back, E., Cameron, C., & Tanner, T. (2009). *Children and disaster risk reduction: Taking stock and moving forward*. Brighton: IDS/Children in a Changing Climate.**

[http://www.preventionweb.net/files/12085\\_ChildLedDRRTakingStock1.pdf](http://www.preventionweb.net/files/12085_ChildLedDRRTakingStock1.pdf)

What does child-centred disaster risk reduction (DRR) look like, and what is its particular value? Today's children will bear a disproportionate share of the impact of the increasing frequency and severity of disasters, both in the immediate and longer term. They are also critically important actors in addressing disaster risk, now and in the future. This report presents 16 case studies from around the world that illustrate DRR interventions involving children, along a continuum from expanding knowledge, to enhancing voice, to taking action. It recommends greater focus on supporting children engaged in action to influence and transform DRR in their communities and countries.

**Plan International. (2011). *Weathering the storm: Adolescent girls and climate change*. Plan International.** <http://www.plan-uk.org/resources/documents/35316/>

What is the impact of climate change on girls? This report identifies the climate change impacts and girls' 'double disadvantage' of gender and youth. Analysis of primary evidence from Ethiopia and Bangladesh shows that climate change poses specific risks for girls and prevents them from realising their rights. Some of the negative impacts include sexual exploitation and violence, early marriage, death from pregnancy, and high HIV infection rates. The report demonstrates that girls' agency is critical for climate change adaptation and emphasises the need for policymakers to recognise girls as agents of change.

### **Older people**

Older people are considered at highest risk of climate change-related health impacts, including heat stress and undernutrition. Their knowledge and experience can add value to adaptation and mitigation efforts, and should be brought into the climate change adaptation process (HelpAge, 2009).

**HelpAge. (2009). *Witness to climate change: Learning from older people's experience*. London: HelpAge International.** <http://www.helpageusa.org/what-we-do/climate-change/witness-to-climate-change-learning-from-older-peoples-experience/>

This paper is based on research with older men and women from Bangladesh, Bolivia, Ethiopia, India, Kenya, Kyrgyzstan, Mozambique, Tanzania and Zimbabwe. It looks at older people's experience and awareness of climate change, and calls for better inclusion of their views in developing adaptive strategies. Older people are particularly vulnerable to the effects of climate change and are repositories of indigenous knowledge and experience that could contribute to local and national adaptation. They are, however, excluded from climate change debates.

### **Indigenous peoples**

Indigenous peoples and minority groups tend to live in areas that are among the worst affected by climate change, yet they have been broadly excluded from climate change discussions. Many indigenous groups are **primary users of natural resources** – their livelihoods depend on ecosystems based on forest and water resources. These groups are repositories of **traditional ecological knowledge**. Such knowledge has evolved over time in parallel with customary institutions and practices, supporting a balanced and sustainable relationship between society and its resource base (Mearns & Norton, 2010). But political discrimination and high rates of poverty among these communities exacerbate their exclusion from decision-making on climate change-related processes. Such exclusion can even increase their vulnerability – if, for example, mitigation measures lead to injustices. Despite these challenges, indigenous and minority groups can add significant value to climate adaptation and mitigation processes, particularly given their often expert knowledge of the natural environment (Kronik & Verner, 2010).

**Baird, R. (2008). *The impact of climate change on minorities and indigenous peoples* (Briefing paper). London: Minority Rights Group.**

[http://www.ohchr.org/Documents/Issues/ClimateChange/Submissions/Minority\\_Rights\\_Group\\_International.pdf](http://www.ohchr.org/Documents/Issues/ClimateChange/Submissions/Minority_Rights_Group_International.pdf)

How do climate-related disasters and slow-onset climate changes affect minorities and indigenous peoples? Why are these groups especially sensitive to the effects of climate change? In examining such questions, this report highlights a neglected area of research. It emphasises the important role of these groups as stewards of natural environments that are major carbon sinks and biodiversity hotspots. It argues for the explicit inclusion of minority and indigenous groups in plans for combating, and adapting to, climate change. National Adaptation Programmes of Action, international human rights law, and new guidelines for humanitarian agencies provide opportunities for these groups to make themselves heard.

**Kronik J., & Verner, D. (2010). *The role of indigenous knowledge in crafting adaptation and mitigation strategies for climate change in Latin America*. In R. Mearns & A. Norton (Eds.), *Social dimensions of climate change: Equity and vulnerability in a warming world* (pp. 199-256). Washington, DC: World Bank. <http://hdl.handle.net/10986/2689>**

This chapter provides case studies from Latin America of the expansive knowledge base and experiences among indigenous peoples in balancing ecosystem use with human needs. It examines three main issues: social impacts of climate change on indigenous peoples in Latin America; how indigenous peoples have reacted to environmental change and shaped their societies, cultures, and capacity to adapt; and the role of indigenous peoples' knowledge in climate change adaptation and mitigation. The authors conclude that to achieve climate change adaptation and mitigation it is vital to incorporate and strengthen conditions for the continued use and development of indigenous knowledge. This is particularly important as indigenous peoples have expressed concern over having their autonomy and authority undermined through REDD<sup>4</sup> agreement negotiations.

#### **1.4. What are the international policy frameworks?**

The High Level Panel on Post-2015 goals emphasises that sustainability must be at the core of international development efforts, and recommends immediate action to halt the pace of climate change and environmental degradation, including reducing greenhouse gas (GHG) emissions (United Nations, 2013). The Panel also encourages the incorporation of social and environmental metrics into accounting practices. The **Sustainable Development Goals (SDG) – 2030 Agenda** prioritises climate change adaptation and mitigation measures and consistently considers climate change in relation to vulnerability, socioeconomic development and livelihoods.<sup>5</sup> Climate change is mainstreamed throughout the SDGs and targets. The stand-alone goal directly tackling climate change is Goal 13 – taking urgent action to combat climate change and its impacts. Other goals also emphasise climate change and resilience. These include Goal 2 – ending hunger and improving food security and nutrition; Goal 8 – promoting sustainable economic growth and productive, decent work; and Goal 11 – making cities and urban settlements more resilient and sustainable.

The international policy framework for dealing with climate change is the **United Nations Framework Convention on Climate Change (UNFCCC)**. This includes the **Kyoto Protocol**, which places more responsibility for mitigation on developed countries, and includes binding emissions targets for signatory industrialised countries. The Convention established a system of grants and loans, managed by the **Global**

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<sup>4</sup> Reducing Emissions from Deforestation and Forest Degradation (REDD) aims to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon development. See <http://www.un-redd.org/aboutredd>

<sup>5</sup> <https://sustainabledevelopment.un.org/?menu=1300>

**Environment Facility** (GEF) to help finance climate mitigation and adaptation; this is based on prepared National Adaptation Programmes of Action (NAPAs) to address urgent needs. The NAPAs are to draw from community-level input to identify and address vulnerabilities to climate change.

However, **tensions** have been observed between global climate policy and local communities over policy and strategies. For example, some experts have stated there is concern about the impact of schemes for reducing emissions from deforestation and forest degradation (such as REDD and REDD+<sup>6</sup>) regarding the **rights of indigenous and other forest-based communities** (Larson, 2010). REDD+ was negotiated at the UNFCCC to generate investments for forest-related CO<sub>2</sub> reductions and removals. However, lack of clear land tenure, ineffective law enforcement, and unrecognised customary and ancestral rights may create situations where REDD+ could represent an additional threat to local communities. Experts stress the need for secure community tenure rights (Larson, 2010).

**United Nations. (2013). A new global partnership: Eradicate poverty and transform economies through sustainable development (The report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda). New York: UN. [www.un.org/sg/management/pdf/HLP\\_P2015\\_Report.pdf](http://www.un.org/sg/management/pdf/HLP_P2015_Report.pdf)**

This report on the post-2015 agenda from 27 world leaders, based on global consultation, calls for five 'transformational shifts': leave no one behind; put sustainable development at the core; transform economies for jobs and inclusive growth; build peace and effective, open and accountable institutions for all; and forge a new global partnership. Post-2015 action must move from reducing to ending poverty; must integrate the social, economic and environmental dimensions of sustainable development, including addressing climate change; and must recognise peace and good governance as core elements of well-being.

**Larson, A. (2010). Forest tenure reform in the age of climate change: Lessons for REDD+. *Global Environmental Change*, 21(2), 540-549.**

<http://www.sciencedirect.com/science/article/pii/S0959378010001111>

This article examines two issues arising from schemes for reducing emissions from deforestation and forest degradation (REDD, or REDD+): rights to forests and rules for resource use. It draws on the findings of a study conducted by the Centre for International Forestry Research on forest tenure reforms in selected countries in Asia, Africa and Latin America from 2006 to 2008. The study underlines the numerous obstacles faced by communities, after rights are won, in moving from statutory rights to their implementation and to access to benefits on the ground. It argues that there is currently little reason to expect better results from national policies under REDD+ without binding agreements to protect local rights.

### **Climate finance mechanisms: Investment options and gender-sensitive approaches**

Climate finance mechanisms provide support to poorer countries for cutting emissions and adapting to a changing climate. Finance options for climate change activities include both support for mainstreaming climate change interventions into agricultural and rural investment projects and programmes, and support for stand-alone climate projects or programmes. Climate-specific finance provides resources to support low-carbon and climate resilient development. To date, an array of bilateral and multilateral initiatives is in place to finance climate change, in addition to several carbon funds and development initiatives, but funding levels are insufficient. For example, the largest source of agricultural investment finance are farmers, herders, fishers and foresters themselves – further public investments in climate change measures to complement this is a priority (Dubois et al., 2012; FAO, 2013, Module 14).

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<sup>6</sup> "REDD+" goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks. See <http://www.un-redd.org/aboutredd>



Women and men have different types of exposure to climate risks, and use different adaptation measures. Women are disproportionately affected by climate change, but they are often marginalised in investment design decision-making and implementation (FAO, 2013). Some experts therefore emphasise the need for gender-responsive climate financing instruments and funding allocations (Schalatek, 2013; World Bank/FAO/IFAD, 2015, Module 18). Explicit gender criteria in performance objectives and evaluation are recommended, as well as gender balance in staff administering climate finance, and a robust set of gender safeguards for implementation.

**World Bank. (2012). *Carbon livelihoods: Social opportunities and risk of carbon finance*. Washington, DC: World Bank. <http://hdl.handle.net/10986/18369>**

Do carbon projects offer livelihood opportunities or present risks? This report reviews the literature and analyses 85 examples from the World Bank's carbon finance portfolio. In theory, 'carbon credit' projects in low-income countries can both reduce emissions and contribute to sustainable development; but in practice they make only a small contribution to the livelihoods of poor people. Projects with greater potential livelihood benefits, such as clean cook-stoves and solar home systems, tend to reduce emissions less. This suggests that there are trade-offs between emissions reduction and livelihood benefits. Reforms to carbon finance rules and project design and implementation could strengthen synergies.

**Schalatek, L., & Nakhooda, S. (2013). *Gender and climate finance (Climate finance fundamentals 10)*. London: ODI. <http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8682.pdf>**

Gender plays a key role in contributing to climate change vulnerability. This report identifies key principles and actions for gender-responsive climate finance. These include:

- gender equality as a guiding principle and a cross-cutting issue for all climate finance instruments;
- a gender balance and gender expertise among staff administering climate finance, to ensure equality principles are integrated in funding and programme guidelines; and
- a robust set of social, gender and environmental safeguards and guidelines for implementation to ensure gender equality, women's rights and women's full participation.

## 2. Evidence of impact and approaches

Climate change will affect key sectors and areas of social development and livelihoods programming in multiple ways. However, there are gaps and uncertainties about the effects of climate projections. This section identifies available evidence on how climate change will affect social development goals in relation to specific sectors and contexts. It also examines how social development interventions can reduce vulnerability and increase adaptive capacity in relation to climate change.

### 2.1. Sector impacts and interventions

#### Agriculture and food security

##### How will climate change affect agriculture and food security?

Climate change is already negatively affecting agriculture and food production – particularly on the livelihoods and welfare of rural communities and those dependent on subsistence agriculture (Foresight 2011; FAO, 2013, 2016). Future impacts of climate change on agriculture and food production are likely to be severe. Resources necessary for food production will be placed under greater pressure, and changes in rainfall patterns and rising temperatures will affect crop yields (Foresight, 2011). Fisheries, aquaculture, livestock production, forestry and all agro-ecosystems will be affected by environmental changes, as will related physical structures (Foresight, 2011; FAO, 2016).

The most recent IPCC report (IPCC, 2014) cautions that rural livelihoods will be at risk from reduced agricultural production. Experts indicate that climate change will have a severe impact on food security and nutrition, as well livelihoods (HLPE, 2010; FAO, 2016). Environmental changes are likely to **reduce production**, increasing vulnerability and resulting in lower incomes, weakening livelihoods and resilience, and lowering consumption (FAO, 2016). Quantitative models already predict an **increase in world food prices**, particularly for important agricultural crops such as rice, wheat, maize and soybean (Foresight 2011; FAO, 2016). Climate change impacts will be particularly harmful for farmers and pastoralists in semi-arid regions (IPCC, 2014).

**Pastoralist systems** depend on a balance between people, livestock and pastures. When this is disrupted, the impacts can be devastating for individuals' and communities' livelihoods and well-being (Anderson et al., 2010). Observed environmental changes in drylands include lower rainfall, more intense and longer droughts, and higher temperatures. These will have a variety of direct and indirect effects on pastoralist livelihoods, including greater risk of food security, more outbreaks of animal disease, and more soil erosion (Anderson et al., 2010). Despite these challenges, where mobility of people and herds is unconstrained, pastoralism is an effective adaptation strategy (Humanitarian Policy Group, 2009).

**Foresight. (2011). *The future of food and farming: Challenges and choices for global sustainability*. London: Government Office for Science. <http://www.bis.gov.uk/foresight/our-work/projects/published-projects/global-food-and-farming-futures/reports-and-publications>**

This report provides an overview of the anticipated impacts and pressures on the global food systems from 2011 to 2050, drawing on mixed-method empirical research. Pressures identified include an increase in global population (to an anticipated nine billion) and greater competition for land, water and energy. The report identifies five classes of action to address the challenge of balancing supply and demand: acting sustainably; addressing the threat of future volatility in the food system; ending hunger; reducing greenhouse gas emissions from the global food system; and maintaining biodiversity and ecosystems while feeding the world.

**HLPE. (2012). *Food security and climate change. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*. Rome: Committee on World Food Security.** [http://www.fao.org/fileadmin/user\\_upload/hlpe/hlpe\\_documents/HLPE\\_Reports/HLPE-Report-3-Food\\_security\\_and\\_climate\\_change-June\\_2012.pdf](http://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/HLPE_Reports/HLPE-Report-3-Food_security_and_climate_change-June_2012.pdf)

Based on a review of existing evidence, this expert panel examines the impact of climate change on food security. The report states that climate change will have detrimental impacts on food security and agricultural systems by: reducing the productivity of existing food systems; harming the livelihoods of those already vulnerable to food insecurity; and increasing the challenges of providing clean water. The report calls for urgent action to address the impacts of climate change at all levels and recommends: integrating food security and climate change concerns; increasing the resilience of food systems to climate change; developing low-emission agricultural strategies; collecting and disseminating local information and knowledge; and facilitating the participation of stakeholders in decision making and implementation.

### **Pastoralists**

**Anderson, S., Morton, J., & Toulmin, C. (2010). *Climate change for agrarian societies in drylands: Implications and future pathways*. In R. Mearns & A. Norton (Eds.), *Social dimensions of climate change: Equity and vulnerability in a warming world* (pp. 199-256). Washington, DC: World Bank.** <http://hdl.handle.net/10986/2689>

This chapter outlines the main impacts of climate change on the livelihoods of pastoralists and those living on drylands. Both the physical geography of drylands and political and economic factors can constrain the livelihoods of pastoralist communities. Policies to address climate change impacts should ensure a strong presence of, and voice for, those affected; advance regional cooperation; and focus on improved water management at local, national and regional levels.

**Humanitarian Policy Group. (2009). *Pastoralism and climate change: Enabling adaptive capacity* (HPG Commissioned Reports). London: ODI.**

<http://www.odi.org.uk/publications/3304-pastoralism-climate-change-adaptation-horn-africa>

The effects of climate change on the drylands of the Horn of Africa pose difficult policy challenges. This synthesis paper argues that pastoralism is a logical adaptation route in areas of increased climatic variability, and has an important role to play where other livelihoods are likely to fail. However, pastoralists' resilience to drought and adaptive capacity must be built upon and supported. Evidence suggests policies should support pastoralists to improve drought preparedness, planning, disaster management structures and risk reduction efforts, rather than directly providing adaptation strategies.

### **Gender, agriculture and climate change**

Understanding the gender division of labour in a given context – notably in agricultural activities, care responsibilities, food security and nutrition – is vital to addressing climate change. Analysing gender-specific perceptions and responses to climate risks is also key. Climate change will have gender-differentiated impacts that will require **gender-differentiated adaption responses**. This is because men's and women's roles and experiences vary, as do their abilities to access benefits, their ways of using the natural resource base, and their mitigation strategies. The design of interventions will be heavily influenced by social and cultural norms and by decision-making and bargaining within households (FAO, 2016; Lambrou & Nelson, 2010).

Women play a vital role in agriculture – as producers, processors, traders and agents of food and nutritional security (World Bank/FAO/IFAD 2009, 2015, Module 18). The experience of women and girls in

managing natural resources makes them well placed to take a lead in adaptation programmes in the agricultural sector (Skinner, 2011). Policies and **legislation** are also important to consider when designing interventions. For example, unequal property rights are particularly significant for agricultural interventions, as men and women have different incentives for investments and different levels of access to financial resources (World Bank/FAO/IFAD, 2009). Gender equality measures need to be taken into account in the food system to promote women's agency and participation in decision making. Such participation is particularly relevant for climate change adaptation to **ensure women share in benefits** (Foresight, 2011; FAO, 2016).

**Lambrou, Y., & Nelson, S. (2010). *Farmers in a changing climate: Does gender matter? Food security in Andhra Pradesh, India*. Rome: FAO. <http://www.fao.org/docrep/013/i1721e/i1721e.pdf>**

What are the gender dimensions of climate change and agriculture? This report draws on a survey in two drought-prone districts in India. It identifies a strong gender dimension to how climate change is experienced and the response mechanisms men and women adopt. For example, limited water availability increases household work for women, while more women than men indicated they would go without food in times of low rainfall. Gender analysis is recommended to identify differential impacts and mitigation approaches adopted.

**World Bank, FAO, & IFAD (2009). *Gender in Agriculture Sourcebook*. Washington, DC: World Bank. <http://siteresources.worldbank.org/INTGENAGRLIVSOUBOOK/Resources/CompleteBook.pdf>**

This sourcebook provides a guide for practitioners and technical staff in addressing gender issues, and integrating gender-responsive actions in the design and implementation of agricultural projects and programmes. The sourcebook covers 16 thematic areas, including agriculture, livestock, forestry, and fisheries, and draws from a range of case study examples. The most recent addition to the Sourcebook is Module 18 (see link below and Section 3), which focuses on Gender and Climate-Smart Agriculture. The module provides guidance and tools for integrating gender in planning, design, implementation and evaluation of programmes and investments related to climate-smart agriculture.

## **Agricultural adaptation and mitigation**

Agriculture makes a notable contribution to greenhouse gas emissions and so is a prime sector for adaptation and mitigation (IPCC, 2014). Options include both supply- and demand-side measures, including: more efficient management practices of resources such as land and livestock; reduced food losses and waste; and changes in diet and wood consumption (IPCC, 2014; FAO, 2013). Adaptive measures in agriculture can enable higher household incomes, offer greater protection to the asset base, and, importantly, help communities become less vulnerable to extreme weather events (IFAD, 2013). Climate adaptation also presents opportunities for smallholders to diversify production and spread climate risk across different income streams, as well as to build resilience by reducing their dependency on climate-sensitive livelihoods (IFAD, 2014a, 2013; Davies et al., 2009).

Available examples demonstrate success in adopting climate-smart agricultural practices across agricultural sub-sectors and global contexts (FAO, 2014, 2013). Programme mechanisms that have effectively promoted climate-smart interventions through provision of funding opportunities for a range of smallholder adaptation activities include for example, the Adaptation for Smallholder Agriculture Programme (ASAP). This programme supports activities ranging from increasing the resilience of rural infrastructure to improving capacity to manage risks from water-related disasters. Some case studies show how ASAP-supported interventions have strengthened women's empowerment and promoted gender equality – for instance, by increasing women's asset base (IFAD, 2014b).

**IFAD. (2013). *The adaptation advantage: The economic benefits of preparing small-scale farmers for climate change*. Rome: IFAD.**

<https://www.ifad.org/documents/10180/0a24e248-3f96-49af-b2df-ebbce284335c>

What are the economic benefits of smallholder adaptation? This report includes case studies from Kenya, Turkey, Viet Nam, Bangladesh and Bolivia, and quantifies benefits using economic evaluations of adaptation measures, such as cost-benefit comparisons. The cases document a range of rural adaptation activities, such as flood protection and economic inclusion, and skill development to improve smallholders' resilience.

**IFAD. (2014a). *Adaptation for Smallholder Agriculture Programme*. Rome: IFAD.**

<http://www.ifad.org/climate/asap/asap.pdf>

This report outlines of the Adaptation for Smallholder Agriculture Programme (ASAP), which is a multi-year, multi-donor financing source for smallholders' adaptation. ASAP aims to: improve land management and promote gender-sensitive and climate-resilient agricultural practices; increase the availability and use of work for agricultural production; increase capacity to manage short- and long-term risks from water-related disasters; increase climate resilience of rural infrastructure; and document and disseminate knowledge on climate-smart practices in smallholder agriculture.

**IFAD. (2014b). *The gender advantage: Women on the front line of climate change*. Rome: IFAD.**

<http://www.ifad.org/climate/asap/asap-gender.pdf>

This report provides 10 case studies from around the world. These illustrate that gender-sensitive adaptation results in better livelihood options and incomes, more food security and reduced workloads for women and their families, and more informed decision-making about their lives by women and men.

**FAO. (2014). *Climate-smart agriculture on the ground*. Rome: FAO** <http://www.fao.org/3/a-i3817e.pdf>

This booklet provides successful examples of climate-smart systems supported by FAO in various countries. Cases show the diversity of potential options across different regions and agricultural systems, including forestry, livestock grazing, smallholder farming, ecosystem approaches in the fisheries sector. They also cover subjects such as biodiversity and gender.

**IPCC. (2014). *Agriculture, forestry and other land use (AFOLU)*. In O. Edenhofer, R. Pichs-Madruga, Y. Sokona et al. (Eds.), *Climate change 2014: Mitigation of climate change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press.** [https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc\\_wg3\\_ar5\\_chapter11.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter11.pdf)

How can agriculture, forestry and other land use sectors (AFOLU) mitigate against climate change? Mitigation is derived from both the removal of greenhouse gases, and reducing emissions through the management of land and livestock. The AFOLU sector is responsible for almost a quarter of GHG emissions. Opportunities for mitigation include land and livestock management, reducing losses and waste of food, and changes in diet and wood consumption. Challenges in implementing mitigation options include financing, poverty, technological development, and diffusion and transfer barriers.



## Health

### How will climate change affect health?

Environmental changes are already affecting human health, and are likely to lead to greater frequency and coverage of **infectious diseases** such as malaria, particularly in developing countries. A rise in air pollutants and allergens may lead to more cases of **respiratory disease** (Confalonieri et al., 2007). Greater frequency and intensity of extreme weather events, such as floods and heat waves, will increase **mortality and injury** rates, particularly among women, older people and children (WHO, 2012; 2014). **Malnutrition** rates are also likely to increase, particularly because agriculture is already being affected by environmental changes (FAO, 2016).

Social consequences of climate change will also have a direct impact on health. Experts caution that population displacement following natural disasters, for example, may lead to psychological stress and place women at higher risk of **sexual and domestic violence** (WHO, 2012; 2014).

Groups that are particularly vulnerable to health-related impacts of climate change include women, older people, children, traditional societies, subsistence farmers, and coastal populations (Confalonieri et al., 2007). Gender is a particularly important determinant of how climate change impacts health (WHO, 2012; 2014).

**Confalonieri, U., Menne, B., Akhtar, R., Ebi, K. L., Hauengue, M., Kovats, R. S., & Woodward, A. (2007). Human health. In M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden, & C.E. Hanson (Eds.), *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 391-431).. Cambridge University Press. <http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter8.pdf>**

The paper finds that there is 'very high confidence' that climate change currently contributes to the global burden of disease and premature death, and that health risks will be greatest in low income countries and among the poor, older people, children, traditional societies, subsistence farmers and coastal populations. Identified health impacts range from changes in the distribution of some infectious disease vectors, to an increase in deaths and injuries related to extreme weather events. The paper argues that adaptive capacity needs to be improved globally, and that economic development is an important component of this adaptation.

**WHO. (2014). *Gender, climate change and health*. Geneva: WHO. <http://www.who.int/globalchange/GenderClimateChangeHealthfinal.pdf>**

Based on mixed-method evidence, this paper identifies gender differences in the health risks and impacts of climate change. It finds a range of gender-relevant impacts, including: women are more likely to die during natural disasters than men; gender roles, norms and relations may prevent women from accessing health care; and pregnant women are more vulnerable to certain diseases, such as malaria.

Recommendations include: gender-sensitive research to identify factors that contribute to vulnerability; gender-responsive and accessible health services that reach the poorest populations; and adaptation strategies that consider women's and men's capacities, power, resilience, vulnerabilities and resources.

### Adaptation and mitigation in health

Adaptation and mitigation efforts in the health sector have been hampered by capacity constraints, including weak research capacity to inform adaptation and poor primary health information systems (Costello, 2009). Experts contend, however, that mitigation and adaptation actions provide added benefits in relation to health. Recommendations include gender-sensitive health and awareness campaigns; health surveillance and monitoring systems; gender-responsive accessible health services; and tailoring health adaptation approaches to existing capacities.

**Costello, A., Abbas, M., Allen, A., Ball, S., Bell, S., Bellamy, R., & Patterson, C. (2009). Managing the health effects of climate change. *The Lancet*, 373, 1693-733.**

<http://www.ucl.ac.uk/global-health/project-pages/lancet1/ucl-lancet-climate-change.pdf>

Based on qualitative empirical evidence, this article argues that climate change will place millions of people at risk and increase health inequity by negatively impacting key determinants of health. Challenges include: weak research capacity to inform adaptation; the need to improve primary health information systems; and the need to share local knowledge on a wider scale. A public health and advocacy movement is suggested to bring together relevant actors from local communities, government, international agencies, NGOs and academia. Adaptation and mitigation measures should support local government and communities to understand the implications of climate change; consider climate change in all governance actions; and introduce accountability mechanisms to monitor progress.

**WHO. (2012). *Mainstreaming gender in health adaptation to climate change programmes*. Geneva: WHO.** [http://www.who.int/globalchange/publications/mainstreaming\\_gender/en/index.html](http://www.who.int/globalchange/publications/mainstreaming_gender/en/index.html)

This guide identifies the gender dimensions of health and climate change, and provides recommendations for how gender can be mainstreamed into health adaptation to climate change programmes. It suggests two approaches: a gender analysis; and a checklist for gender mainstreaming, which includes recommendations for each phase of the programme cycle.

**McMichael, A., Campbell-Lendrum, D., Corvalán, Ebi, K., Githeko, A., Scheraga, J., & Woodward, A. (Eds.). (2003). *Climate change and human health: Risks and responses*. Geneva: WHO.**

<http://www.who.int/globalchange/publications/climchange.pdf>

This paper draws on mixed-method evidence to identify a wide range of climate change impacts on health. Among these are increased mortality due to temperature change and natural disasters, and changes in the dispersal and rate of vector-borne disease. Recommendations include basing adaptation approaches on appropriate technologies, information, finance and institutional capacity; and better quantitative data to help target adaptation.

## **Water**

### **Effects of climate change on freshwater resources**

There is abundant evidence that freshwater resources will be affected by climate change, and concern that these impacts will harm societies and ecosystems, and subsequently social and economic development (Bates et al., 2008; Calow et al., 2011; UN Water, n.d.). Observed and projected impacts will increase **food insecurity** and vulnerability among people living in arid and semi-arid areas in particular (Bates et al., 2008). Populations whose livelihoods depend on water ecosystems, such as fishing communities, will face growing challenges (see Coastal zones below). Higher and fluctuating temperatures are likely to reduce **water quality** (Bates et al., 2008; Calow et al., 2011), which will affect human health and ecosystems, and will probably lead to an increase in water-borne disease (Calow et al., 2011). Economic implications will include higher costs for existing **water infrastructure and management** practices such as flood defences, and irrigation and sanitation systems (Bates et al., 2008; Mogaka et al., 2006; FAO, 2013, Module 3).

Water scarcity may also worsen the existing **stresses of population growth and urbanisation** (Bates et al., 2008; Calow et al., 2011). Questions of equity and access therefore become critical issues (Calow et al., 2008). For example, for **women and girls**, water scarcity means having to spend more time and travel further to collect water, which reduces their productive work and economic opportunities (IFAD, 2007). Accordingly, some experts emphasise the importance of recognising resource access and entitlement issues in designing climate change adaptation and mitigation measures.

**Bates, B. C., Kundzewicz, Z. W., Wu, S., & Palutikof, J. P. (Eds.). (2008). *Climate change and water. Technical paper of the Intergovernmental Panel on Climate Change*. Geneva: IPCC Secretariat.**  
<http://www.ipcc.ch/pdf/technical-papers/climate-change-water-en.pdf>

Observational records and climate projections provide abundant evidence that freshwater resources are vulnerable and may be significantly affected by climate change. Such impacts will have wide-ranging consequences for societies and ecosystems. This paper presents an overview of IPCC research on water, highlighting the strong likelihood of increased variability and extremes, areas of uncertainty, and regionally-differentiated impacts. Negative impacts of climate change on freshwater systems are expected to outweigh the benefits. Adaptation strategies need to integrate demand- and supply-side action, designed in the context of wider development, environment and health policies.

**Mogaka, H., Gichere, S., Davis, R., & Hirji, R. (2006). *Climate variability and water resources degradation in Kenya: Improving water resources development and management* (World Bank Working Paper No. 69). Washington, DC: World Bank.**  
<http://documents.worldbank.org/curated/en/2005/07/6525859/climate-variability-water-resource-degradation-kenya-improving-water-resources-development-management>

This report focuses on the economic implications of water resource management in Kenya (and Africa more widely), highlighting the effects of climate variability and the steady degradation of water resources. Both processes have significant economic impacts over the long term. Increased investment in infrastructure and better management of water resources are advocated to reduce costs.

**Calow, R., Bonsor, H., Jones, L., O'Meally, S., MacDonald, A., & Kaur, N. (2011). *Climate change, water resources and WASH: A scoping study*. London: ODI.**  
<http://www.odi.org.uk/sites/odi.org.uk/files/odi-assets/publications-opinion-files/7322.pdf>

This report reviews the literature on current understanding of climate change projections and scenarios, and discusses the implications for water supply, sanitation and hygiene (WASH) in Sub-Saharan Africa (SSA) and South Asia. Water scarcity is not environmentally determined, but driven by questions of equity and access; demographic change will be a more important driver of water scarcity than climate change in SSA until at least 2050. Refocusing the debate on water security offers a way forward, emphasising the importance of resource access and entitlements as well as water availability.

**IFAD. (2007). *Gender and water. Securing water for improved rural livelihoods: The multiple-use system approach*. Rome: IFAD.** [http://www.ifad.org/gender/thematic/water/gender\\_water.pdf](http://www.ifad.org/gender/thematic/water/gender_water.pdf)

How can women participate in water management? This review examines the impact of water-related projects on women, women's role in managing water resources, and constraints women face in gaining access to water. Lessons in promoting women's participation in decision-making from IFAD-supported water projects include: enhancing women's access to financial services by allocating a minimum quota of loans for women; and enhancing women's capacity through training in income-generation activities, irrigation methods, and water conservation. Approaches to mainstream gender in water management include gender-sensitive project design and targeting, sex-disaggregated data collection and analysis, gender-sensitive indicators, and gender-responsive budgets.

## **Mitigation and adaptation in the water sector**

Experts suggest that **water management practices** should be made more robust by incorporating improved information systems about climate variability, adjusting and re-engineering systems, modifying demand, and introducing new technology (Bates et al., 2008; UN Water, n.d.; World Water Assessment Programme, 2009). Others urge donors to climate-screen WASH and resource management strategies and to climate-proof interventions, maximising climate change mainstreaming at different levels. They also advise giving project managers guidance on how to minimise risk (Calow et al., 2008; FAO, 2013,

Module 3). Evidence suggests that effective mitigation to improve water-use efficiency requires both demand- and supply-side strategies, for example, using economic incentives through metering, combined with increased water storage (Bates et al., 2008).

Because climate change impacts on water affect many policy areas (e.g. health, energy, agriculture and livelihoods), experts recommend that adaptation and mitigation options should incorporate a **wide spectrum of water-dependent sectors** (Bates et al., 2008; FAO, 2013, Module 3). Experts also argue that water adaptation should be addressed within the broader development context, focusing on challenges for poverty reduction, hunger, disease and environmental degradation (UN Water, n.d.).

Lessons from **community-level adaptation** projects include: build on existing coping strategies; adopt wide-ranging communication strategies; harness local and national support; and include broad-based livelihood improvement (Calow et al., 2008). Women can play a central role in the provision, management and safeguarding of water in developing countries (IFAD, 2007).

**World Water Assessment Programme. (2009). *Water in a changing world. World water development report.* UNESCO/Earthscan. <http://www.unwater.org/publications/publications-detail/en/c/202716/>**

This report analyses the state of the world's freshwater resources. Human activities have become primary drivers of the pressures affecting water systems. Important decisions affecting water management are made outside the water sector and are driven by external, largely unpredictable forces including demography, climate change, and technological innovation. Decision-making in other development sectors – such as food, energy, disaster management and climate change – should incorporate water as an integral component. Investment in improved water resource management can prevent losses from droughts and floods, and build resilience to climate variability.

**UN Water. (n.d.). *Climate change adaptation: The pivotal role of water.* UN Water. [http://www.unwater.org/fileadmin/user\\_upload/unwater\\_new/docs/unw\\_ccpol\\_web.pdf](http://www.unwater.org/fileadmin/user_upload/unwater_new/docs/unw_ccpol_web.pdf)**

Water is the primary medium through which climate change influences ecosystems and societies. This policy brief notes that water stress is already high in many developing countries, and argues that adaptation must be addressed in a broad development context. Five broad approaches are outlined: new investment, adjusting existing practices, re-engineering existing systems, modifying demand, and introducing new technology. Countries are urged to improve their water resource management systems and implement 'no regrets' strategies – measures that provide development benefits now, as well as strengthening resilience to climate change.

## Energy

### What role does low-carbon energy play in social development?

Energy affects all aspects of development from livelihoods and education to health and gender equality. Energy is central to both sustainable development and poverty reduction efforts.<sup>7</sup> Affordable energy access is a prerequisite for poverty reduction and economic growth, and also plays a crucial role in climate change mitigation and adaptation (Mearns & Norton, 2010; FAO, 2013). Sustainable forest management can contribute significantly to climate change adaptation and mitigation, but there are trade-offs to consider in mainstreaming adaptation and mitigation actions in the forest sector (FAO, 2013). **Renewable technologies**, such as solar, ocean and wind energy, can help mitigate the effects of GHG emissions, although challenges remain. The UN advocates Sustainable Energy for All (UN-SEA) by 2030 and calls for partnerships among government, businesses and civil society to ensure universal access to modern energy services (Sustainable Energy for All, 2012).

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<sup>7</sup> [http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus\\_areas/sustainable-energy.html](http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/sustainable-energy.html)

**Sustainable Energy for All. (2012). *Sustainable Energy for All: A global action agenda – Pathways for concerted action toward sustainable energy for all*. New York: UN.**

<http://www.un.org/wcm/webdav/site/sustainableenergyforall/shared/Documents/SEFA-Action%20Agenda-Final.pdf>

How can the UN's goal of Sustainable Energy for All by 2030 be achieved? This report, based on the work of technical task groups, sets out an agenda for action to meet the three objectives of ensuring universal access to modern energy services, doubling the global rate of improvement in energy efficiency, and doubling the share of renewable energy in the global energy mix. Recommendations cover 11 action areas, including power generation, industry and agriculture, and transport. Sustainable development is not possible without sustainable energy; achieving both requires new partnerships among governments, businesses, and civil society.

**FAO. (2013). *Climate-smart forestry*. In *Climate Smart Agriculture Sourcebook (Module 9)*. Rome: FAO.**

<http://www.fao.org/3/a-i3325e.pdf>

This module provides a brief list of key messages for mainstreaming climate adaptation and mitigation measures into the forest sector. Highlights include: analysing costs and benefits for livelihoods and national development; tailoring interventions to local context, with attention to equity, gender issues and local institutions; designing interventions to target the most vulnerable; examining benefits of forest and tree ecosystems; examining forest tenure issues; and involving indigenous peoples in climate change adaptation and mitigation activities.

### **Mitigation and adaptation opportunities**

Access to clean, reliable and affordable energy technologies affects sustainable development initiatives and provides a wide range of development opportunities, including improved health outcomes and employment (Pachauri et al., 2013). Evidence has identified a positive relationship between access to electricity and non-income benefits, such as education and health, and less clear connections between energy consumption and economic growth (Pueyo et al., 2013).

**Women and girls**, who tend to be responsible for household energy, can particularly benefit from more efficient energy systems. These allow women and girls to spend more time on education and labour market participation, and help empower them to become key actors in mitigation (Pachauri et al., 2013). Case studies show how climate-related financing has been used to promote energy access and support the economic and social empowerment of women (Karlsson & Rojas, 2013; Global Alliance for Clean Cookstoves, 2012). The *Garmeen Shakti* programme in Bangladesh, for example, trains women to install and maintain Solar Home Systems (SHS) and **improved cook stoves**. In addition to reducing GHG emissions and addressing energy deficits, the programme provides **job creation** for women and clean technology for **improved health outcomes**.<sup>8</sup> Similarly, Solar Sister, based in Uganda and Rwanda, provides women with education, training and support to create micro-businesses selling solar-powered lamps and phone chargers to provide household income and address energy poverty.<sup>9</sup>

**Pachauri, S., Scott, A., Scott, L., & Sheperd, A. (2013). *Energy for all: Harnessing the power of energy access for chronic poverty reduction*. London: Chronic Poverty Advisory Network.**

<http://www.chronicpoverty.org/resources/2014/6/16/energy-policy-guide>

Energy poverty strongly correlates with income poverty, and is most acute in the poorest households in rural areas. This guide argues that access to electricity, combined with assets, can help people escape

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<sup>8</sup> See: <http://www.internationalrivers.org/resources/grameen-shakti-a-vanguard-model-for-rural-clean-energy-7888>

<sup>9</sup> See: <http://www.solarsister.org/>



persistent poverty. Complementary interventions, coordination, and inter-sectoral collaboration are recommended to maximise the poverty reduction potential of energy services.

**ESMAP. (n.d.). *Innovative approaches to energy access for the urban poor: Summaries of best practices from case studies in four countries*. Washington, DC: ESMAP.**

[http://www.esmap.org/sites/esmap.org/files/FINAL\\_EA-Case%20Studies.pdf](http://www.esmap.org/sites/esmap.org/files/FINAL_EA-Case%20Studies.pdf)

Drawing from four case studies, this paper provides an overview of approaches to increasing energy access among the urban poor. Barriers to access include: cost; the illegal and temporary status of some housing; lack of education and awareness; and a lack of trust between communities and service providers. Innovative technologies are recommended, as well as providing credible evidence to inform policy, and establishing effective financial and institutional financing mechanisms.

**Karlsson, G., & Rojas, A. (2013). *The benefits of gender balance in climate change mitigation investments and sustainable energy initiatives*. Leusden, The Netherlands: ENERGIA.**

<http://www.energia.org/cms/wp-content/uploads/2015/04/07.->

[ENERGIA\\_Gender\\_Balance\\_CC\\_Mitigation\\_Investments\\_Sustainable\\_Energy\\_Initiatives.pdf](http://www.energia.org/cms/wp-content/uploads/2015/04/07.-ENERGIA_Gender_Balance_CC_Mitigation_Investments_Sustainable_Energy_Initiatives.pdf)

This report uses examples from Bangladesh, Kenya, Nepal and Tanzania to illustrate practical ways in which climate-related financing can help promote energy access for all, and therefore support the social and economic empowerment of women and gender equality. Lessons on gender mainstreaming need to be applied to new funding streams such as the UN's Sustainable Energy for All initiative, and the UNFCCC's Green Climate Fund. Additional efforts are needed to ensure that women are able to obtain information about and access to climate-related funds, plus the necessary technical training and financing for renewable energy business opportunities.

**Global Alliance for Clean Cook Stoves. (2012). *Results report sharing progress on the path to adoption of clean cooking solutions*. Washington, DC: Global Alliance for Clean Cook stoves.**

[http://www.cleancookstoves.org/resources\\_files/results-report-2012.pdf](http://www.cleancookstoves.org/resources_files/results-report-2012.pdf)

What is the current reach of clean cook-stove technology? This report presents data from an online survey of 246 organisations involved in the clean cook-stoves sector, including manufacturers, designers, distributors, and testers. Together they distributed 8.2 million stoves in 59 countries during 2012. Of these, 54% were biomass stoves, while charcoal and (in China) coal stoves are also widely produced. Half of the 2012 stoves were distributed with at least some support from carbon finance, at an average stove offset price of \$10. Further investment in standardisation and testing is recommended.

**Pueyo, A., Gonzalez, F., Dent, C., & DeMartino, S. (2013). *The evidence of benefits for poor people of increased renewable electricity capacity: Literature review*. Brighton: IDS.**

<http://www.ids.ac.uk/publication/the-evidence-of-benefits-for-poor-people-of-increased-renewable-electricity-capacity-literature-review>

Does investment in renewable electricity lead to poverty reduction and economic growth? This report presents the results of a systematic review of 143 papers. It sets out a four-stage theory of change linking renewable energy investment with poverty reduction, and assesses the evidence at each stage. Increased investment in generation capacity does not necessarily lead to increased availability and reliability of supply. Financial barriers such as connection charges limit electricity usage by the poor. There is good evidence linking improved access to electricity with non-income benefits such as education, but less evidence for income-related outcomes, and no clear conclusion on the size or causal direction of the link between electricity consumption and economic growth.

## Low-carbon transport

### What role does low-carbon transport play in climate mitigation and adaptation?

Low-carbon development is essential to reduce adverse effects of climate change, as well as maximise the opportunity to advance to green, sustainable energy, technology and manufacturing (expert comment). Transport is inextricably linked to development and economic growth, and is one of the fastest growing contributors to climate change (ADB, 2010). The bulk of future emissions from the developing world are likely to come from the transport sector, making it a critical sector for climate adaptation and mitigation (Kopp et al., 2013). Given its strong relationship with development, improved transport systems can provide significant co-benefits, such as a reduction in the urban air pollution that affects millions of people (WHO, n.d.).

Transport is also an important sector for adaptation. Climate change has wide-ranging impacts on transportation systems, from structural and material damages to delays and disruption of services. Sustainable transport provides added benefits for women, including better access to economic opportunities, education and health services (Asian Development Bank, 2013).

**Kopp, A., Block, R., & Limi, A. (2013). *Turning the right corner: Ensuring development through a low-carbon transport sector*. Washington, DC: World Bank.**

<http://documents.worldbank.org/curated/en/2013/01/17782806/turning-right-corner-ensuring-development-through-low-carbon-transport-sector>

This report draws on mixed method research and argues that transport is crucial to development; however recognition of the impact of climate on transport has been slow. The urgent need to cut emissions requires a new model for infrastructure and transport services, and institutional change and coordination to integrate supply and demand actions. Climate change widens financing gaps in transport, but current carbon finance is inadequate for transport needs. Better maintenance and management of infrastructure is advocated to reduce vulnerability.

**Asian Development Bank. (2013). *Gender tool kit: Transport: Maximising the benefits of improved mobility for all*. Manila: Asian Development Bank.**

[www.adb.org/documents/gender-tool-kit-transport-maximizing-benefits-improved-mobility-all](http://www.adb.org/documents/gender-tool-kit-transport-maximizing-benefits-improved-mobility-all)

This is a guide for mainstreaming gender into the sustainable transport sector. Gender equality provides multiple co-benefits – including improved access to economic opportunities, education and maternal health services – which may lead to better development outcomes.

### Mitigation and adaptation opportunities

Given its contribution to emissions and its importance to development, sustainable transport should be a primary component of low-carbon development strategies. Various approaches are advocated in the literature, ranging from transiting to low-carbon fuel sources, to improving vehicle efficiency. Low-carbon **mass transit systems** and **active transport** systems are commonly advocated by experts. Studies show they have produced greater co-benefits, particularly for health, than other approaches (Crawford, n.d.; WHO, n.d.). Key considerations for planning transport interventions include affordability, combining technological advancement with behavioural change, and including comprehensive stakeholder consultations.

**WHO. (n.d.). *Health in the green economy: Co-benefits to health of climate change mitigation – Transport sector*. Geneva: WHO. [http://www.who.int/hia/hgebrief\\_transp.pdf](http://www.who.int/hia/hgebrief_transp.pdf)**

This WHO paper reviews the potential health co-benefits of transportation mitigation strategies. Active transport (walking and cycling) and rapid transit/public transport systems can yield greater immediate health co-benefits than improving fuel and vehicle efficiency. Benefits of such approaches range from

reduced respiratory and cardiovascular disease from air pollution, to less exposure to traffic injury risks. However, there is a need for more systematic evaluation of mitigation strategies involving transportation and land use.

**Crawford, G. (n.d.). *Sustainable transport in Colombia: Bogotá and the Transmilenio (Case Study 05)*. Brighton: IDS/Learning Hub. <http://www.ids.ac.uk/files/dmfile/LHcasestudy05-BogotaBRT.pdf>**

This case study identifies the positive role of the Bogotá Transmilenio Bus Rapid Transit (BRT) system in reducing carbon emissions from transport. In addition to reducing emissions, the transit system provided jobs and improved access and mobility across the city. It also introduced pro-poor structured fares. Affordability remains a key challenge, and there are concerns about whether infrastructure will withstand future climate impacts.

**ADB. (2010). *Reducing carbon emissions from transport projects (ADB Evaluation Study)*. Asian Development Bank.**

<http://www.adb.org/sites/default/files/evaluation-document/35942/files/ekb-reg-2010-16-0.pdf>

This independent evaluation of ADB projects finds that low-carbon transport strategies can be among the least costly ways to reduce GHG emissions when they: reduce the need to travel; increase the use of low-carbon transport; and improve transport system management by reducing congestion and inefficiency. Low-carbon strategies can produce disproportionate social and economic benefits for people on low incomes, particularly those dependent on walking and public transport.

## 2.2. Adapting to context

### Conflict and security

#### What is the relationship between climate change and conflict?

There is widespread concern that climate change has the potential to undermine human security and incite conflict. However, evidence of any direct causal relationship between climate change and security is inconsistent. Some qualitative material and single-case analyses infer correlations between **resource scarcity** and increased violence (Buhaung et al., 2008). However, statistical data and quantitative models fail to find robust associations between these variables (Buhaung et al., 2008; Bernauer et al., 2011). The most recent IPCC report (2014) argues that violent conflict increases vulnerability to climate change by harming key components of adaptation, such as social capital, livelihood opportunities, and infrastructure.

Some experts argue that climate change generates **new conflicts** and **security challenges** by worsening resource scarcities, intensifying natural disasters, and undermining state capacity to provide people with services and opportunities (Lind et al., 2010; Buhaung et al., 2008). Environmentally-induced **migration** may cause or worsen conflict – increasing competition over resources, inciting ethnic tensions, and destabilising neighbouring areas, especially where political institutions are weak, or conflict resolution mechanisms are deficient (Reuveny, 2007; Bernauer et al., 2011). Examples in *FAO's Climate-smart agriculture sourcebook* (2013) show how conflicts over diminishing resources cut across a range of sectors, livelihood types and resource users, such as pastoralists in Kenya, small-scale shrimp producers versus fishers in Nicaragua, and livestock grazers versus conservationists in Tibet. Landscape management approaches have proven effective in managing resource conflict among stakeholders with competing interests (FAO, 2013 – see Section 3).

Contextual factors such as governance, institutions and economic conditions are likely to determine whether climate-related events generate conflict (Lind et al., 2010). Climate change may not increase the

risk of conflict in *all* societies (Buhaug et al., 2008). Economic and political contexts influence people's capacity to adapt to climate change, and levels of violence (Bernauer et al., 2011).

**Lind, J., Ibrahim, M., & Harris, K. (2010). *Climate change and conflict: Moving beyond the impasse* (IDS In Focus Policy Briefing 15). Brighton: Institute of Development Studies.**

<https://www.ids.ac.uk/files/dmfile/InFocus15.pdf>

This briefing summarises two opposing views on the impact of climate change on violent conflict – first that climate change causes conflict, and second that politics and institutions cause conflict. It calls for a focus on the economic and political structures that make certain groups and individuals vulnerable over time, rather than on external pressures and shocks as sources of vulnerability.

**Reuveny, R. (2007). Climate change-induced migration and violent conflict. *Political Geography*, 26(6), 656-673.** <http://dx.doi.org/10.1016/j.polgeo.2007.05.001>

What are the links between climate-induced migration and violent conflict? Based on qualitative research, this article suggests that climate change can contribute to conflict in areas receiving migrants through: competition for resources; ethnic tensions; distrust; and other conditions such as underdeveloped economies or reliance on the environment for survival. Episodes of environmental migration have contributed to conflict in some cases due to competition over resources.

Recommendations to mitigate these negative effects include reducing dependence on the environment for livelihoods and protecting vulnerable areas against sea level rise.

**Bernauer, T., Koubil, V., & Böhmelt, T. (2011). *Environmental changes and violent conflict* (Foresight Project: Migration and Global Environmental Change, SR 12). London: Government Office for Science.**

<http://webarchive.nationalarchives.gov.uk/20121212135622/http://www.bis.gov.uk/assets/foresight/docs/migration/science-reviews/11-1131-sr12-environmental-changes-and-violent-conflict.pdf>

This paper identifies mixed evidence on how environmental stress has contributed to conflict. Drawing on qualitative studies, findings show that environmental stress (e.g. drought) has contributed to conflict. However, quantitative analyses – particularly large-N studies – do not find a significant association between conflict and environmental change in a larger population of countries and locations, over a longer period of time. The impact of environmental changes on violent conflict is likely to depend on the economic and political conditions that influence the capacity for adaptation, such as economic resources or technological capabilities.

**UNEP, UN Women, PBSO & UNDP. (2013). *Women and natural resources: Unlocking the peacebuilding potential*. Nairobi and New York: UNEP, UN Women, PBSO & UNDP.**

[http://postconflict.unep.ch/publications/UNEP\\_UN-Women\\_PBSO\\_UNDP\\_gender\\_NRM\\_peacebuilding\\_report.pdf](http://postconflict.unep.ch/publications/UNEP_UN-Women_PBSO_UNDP_gender_NRM_peacebuilding_report.pdf)

What is the relationship between women and natural resources in conflict-affected settings? Women are the primary providers of water, food and energy in rural settings. They are often highly dependent on natural resources for their livelihoods, and are therefore particularly susceptible to changes in the quality and availability of these resources during and after conflict. Lack of access to land can expose women to greater physical and livelihood risk. Natural resource management can enhance women's engagement and empowerment in peacebuilding processes.

### **Approaches to address climate-related security threats**

Despite lack of robust evidence of direct causal links between climate change and security, experts urge that climate-related factors should be considered when designing development and peacebuilding interventions.

**Blondel, A. (2012). *Climate change fuelling resource-based conflicts in the Asia-Pacific* (Asia-Pacific Human Development Report Background Papers Series 2012/12). New York: UNDP.**

<http://www.snap-undp.org/elibrary/Publications/HDR-2013-APHDR-TBP-12.pdf>

What is the role of climate change in resource-based conflict in the Asia-Pacific? This paper argues that environmental changes are likely to act as ‘threat multipliers’ for conflict, particularly in areas that already experience security and development challenges. Recommendations for curbing the effects of climate change include prioritising equitable natural resource management and developing regional mechanisms to share knowledge on the effects of climate change.

**Buhaug, H., Gleditsch, N. P., & Theisen, O. M. (2008). *Implications of climate change for armed conflict*. World Bank, Washington, DC.**

[http://siteresources.worldbank.org/INTRANETSOCIALDEVELOPMENT/Resources/SDCCWorkingPaper\\_Conflict.pdf](http://siteresources.worldbank.org/INTRANETSOCIALDEVELOPMENT/Resources/SDCCWorkingPaper_Conflict.pdf)

This paper finds that climate change could cause conflict and social instability by: increasing resource scarcity; intensifying natural disasters; and bringing about a sea level rise. However, the occurrence of violence depends on contextual factors. While some single-case analyses suggest resource scarcity contributes to organised violence, statistics show no robust correlation between resource scarcity and increased conflict. Recommendations for targeting future development and peacebuilding efforts include investing in rigorous, systematic research, promoting systematic environmental accounting, targeting conflict-prone areas vulnerable to adverse climate change effects, and using development policies for peacebuilding.

**UNEP. (2009). *From conflict to peacebuilding: The role of natural resources and the environment* Nairobi: United Nations Environment Programme.** [http://www.unep.org/pdf/pcdmb\\_policy\\_01.pdf](http://www.unep.org/pdf/pcdmb_policy_01.pdf)

Early findings from an analysis of intrastate conflicts over the past sixty years indicate that ‘conflicts associated with natural resources are twice as likely to relapse into conflict in the first five years’ (p.5). Further, ‘since 1990, at least eighteen violent conflicts have been fuelled by the exploitation of natural resources’ (p.8). Yet fewer than a quarter of peace negotiations for conflicts linked to natural resources have addressed resource management mechanisms. This study argues that the recognition that environmental issues can contribute to violent conflict highlights their potential to also contribute to cooperation and peacebuilding. Integrating the environment and natural resources into peacebuilding strategies is a security imperative.

## **Urban settings**

### **How will climate change affect urban communities?**

The urban poor are on the front line of climate change (Baker, 2012). Cities are often ill-equipped to deal with environmental changes and, given their high population densities and infrastructure, have substantial exposure to natural hazards. Factors that contribute to cities’ vulnerability and increased exposure include inadequate **infrastructure**, poor **urban design and planning**, and proximity to the coast. The rapid and often unplanned expansion of cities (e.g. sprawling informal settlement) has increased the exposure of people and economic assets to the effects of climate change, which include more frequent floods, landslides, heat waves and drought (Satterthwaite et al., 2007). Vulnerability is also directly related to where poor people live in cities – typically in **overcrowded, unsafe or exposed areas** such as slum dwellings, where there is **little access to basic services** (Baker, 2012; Reichlin & Shaw, 2015). The most recent IPCC evidence (2014) anticipates that urban communities are likely to experience increased ill-health and disrupted livelihoods due to environmental changes.

**Baker, J. (Ed.) (2012). *Climate change, disaster risk and the urban poor: Cities building resilience for a changing world*. Washington, DC: World Bank. <http://go.worldbank.org/BPXUJ3ARJO>**

How climate change affects the urban poor is the focus of this report, which draws on case studies from Dar es Salaam, Jakarta, Mexico City, and Sao Paulo. It presents four main messages:

- the urban poor are particularly vulnerable to climate change and natural hazards;
- local governments play a vital role in providing reliable basic services, which are critical to improving resilience;
- cities can build resilience by mainstreaming risk reduction into existing urban planning and management practices; and
- significant financial support is needed for service delivery and infrastructure investments.

**Satterthwaite, D., Huq, S., Pelling, M., Reid, H., & Romero Lankao, P. (2007). *Adapting to climate change in urban areas: The possibilities and constraints in low- and middle-income nations* (Human Settlements Discussion Paper Series: Climate Change and Cities 1). London: IIED. <http://pubs.iied.org/pdfs/10549IIED.pdf>**

A third of the world's people live in urban areas in low- and middle-income countries. Most of these cities and towns are unprepared for adaptation to the increased natural hazards (e.g. flooding or landslides) associated with climate change. Many have very limited infrastructure, poor services, and weak local governments; and many residents live in insecure housing. However, there are substantial synergies between successful adaptation to climate change and successful local development. Gender issues are also noted as influencing risk, vulnerability and resilience. This report highlights the scale of the adaptation challenge in Africa, Asia and Latin America, and discusses how local innovation in adaptation can be encouraged and financed.

**Johannessen, L. M. (2013). *Briefing Paper: Cities in developing countries and their development in response to climate change and resource scarcity. Evidence on Demand*. <http://www.evidenceondemand.info/briefing-paper-cities-in-developing-countries-and-their-development-in-response-to-climate-change-and-resource-scarcity>**

Climate change is just one of many serious environmental issues affecting cities. Vulnerability is influenced by ineffective land planning and underinvestment in infrastructure, low quality housing, insufficient information and resources, and gender issues. Despite the many challenges, urban resilience can be built by mainstreaming climate change into urban planning and infrastructure development, upgrading informal settlements, building flood control for vulnerable areas, and providing significant financial support at the local level to accelerate adaptation.

### **Building resilience of urban communities – approaches to intervention**

Climate change provides impetus to improve living conditions among the urban poor. Many experts call for cities to give attention to climate-related risks in planning, management and service delivery (Johannessen, 2013; Dickson et al., 2012). Case studies show that understanding hazards and risks is a necessary first step in developing adaptation, disaster risk reduction and mitigation policies. Tools for identifying the nature of risk, characteristics of hazards, and the most vulnerable communities and individuals include **urban risk assessments** and the asset-based framework (Baker, 2012; Dickson et al., 2012; Moser & Satterthwaite, 2008). Suggested approaches for urban adaptation include **climate proofing** infrastructure (e.g. building flood controls), improving informal settlements, supporting renewable energy, and working in partnership with local communities (IIED, n.d.; Johannessen, 2013). Successful adaptation requires **local knowledge**, innovation, and equitable and inclusive approaches that harness the full potential of men and women (Moser & Satterthwaite, 2008). Accessible communication



is essential to bridge knowledge gaps between national and local levels – stakeholder workshops have been useful for discussing key issues, for example (Baker, 2012).

**Dickson, E., Baker, J., Hoornweg, D., & Tiwari, A. (2012). *Urban risk assessments: Understanding disaster and climate risk in cities* (Urban Development Series). Washington, DC: The World Bank.**  
<http://ecapra.org/sites/default/files/documents/Urban%20Risk%20Assessments.pdf>

This report presents the Urban Risk Assessment (URA), a flexible framework that enables project and city managers to understand and prepare to manage climate-related risks. Case studies describe the piloting of the methodology in four cities: Mexico City, Jakarta, Dar es Salaam, and São Paulo. The URA focuses on hazard impact assessment, institutional assessment and socioeconomic assessment. Cities urgently need to include such assessments in their planning, management, and delivery of services.

**UN-Habitat. (2011). *Cities and climate change: Global report on human settlements 2011*. London: Earthscan.** <http://mirror.unhabitat.org/pmss/listItemDetails.aspx?publicationID=3086>

Climate change will present unique challenges for urban areas. In addition to physical challenges (e.g. increasing heat waves and higher sea levels), some cities may face risks in providing basic services. Climate change will affect water supply, physical infrastructure, transport, industrial production, and energy provision. Impacts will be particularly severe in low-elevation coastal zones, where many of the world's largest cities are located. Drawing from a global review of climate change mitigation and adaptation measures, this report advocates an integrated, multi-partner approach for climate change action in urban areas. This includes addressing both short- and longer-term issues, and introducing new approaches that support action at different scales and across sectors.

**IIED. (n.d.). *Climate change and the urban poor: Risk and resilience in 15 of the world's most vulnerable cities*. London: IIED.** <http://pubs.iied.org/pdfs/G02597.pdf>

This report outlines lessons learnt regarding the principal effects of climate change in fifteen cities in Africa and Asia, based on case studies and city profiles. Coastal cities are susceptible to a rise in sea level, dryland cities are vulnerable to drought, and high-altitude cities are affected by changing rainfall patterns. In all cities, poverty and rapid urbanisation increase vulnerability. Urban authorities can build resilience by investing in climate-proof infrastructure, ensuring regulatory frameworks are effective, and working in partnership with their low-income populations to support community adaptation.

**Moser, C., & Satterthwaite, D. (2008). *Towards pro-poor adaptation to climate change in the urban centres of low- and middle-income countries* (Human Settlements Discussion Paper Series. Climate Change and Cities 3). London: IIED.** <http://pubs.iied.org/pdfs/10564IIED.pdf>

How can adaptation to climate change in urban areas be pro-poor and enhance adaptation capacity? This paper introduces an asset-based framework to assess the vulnerability of low-income communities, households, and individuals in urban areas. It highlights measures needed to address aspects of risk and vulnerability to extreme weather events. These include safer cities, protective infrastructure and better quality buildings. The framework helps to identify synergies between poverty reduction and resilience to climate change, and clarifies how vulnerability and risk are influenced by income level, age and gender. Strengthening the asset base of households and communities does not just improve adaptive capacity: it also helps develop more competent, accountable local government.

## Coastal zones

Coastal zones are already experiencing adverse effects of climate change and will be increasingly exposed to risk in the coming decades. Without adaptation, sea level rise and climate change are likely to make some islands and low-lying areas uninhabitable. Both biophysical and socioeconomic factors underlie climate-related risks. Human-induced pressures such as land use and high population density (e.g. in Asian mega deltas) are found to contribute to climate change effects (Harvey, 2006). Management of coastal zones in an integrated manner is therefore vital.

Coastal communities engaged in fisheries and the aquatic sector are among the most vulnerable socioeconomic groups to climate change. Sufficient guidance exists to assure sustainability of the sector, but implementation of principles and interventions lags behind (FAO, 2013). Drawing from global experience, lessons for coastal adaptation include: early warning communication and response systems; hazard awareness education; and robust vulnerability assessments leading to prioritisation of disaster prevention and response interventions (e.g. capacity development and strengthening of governance and institutions) (Adams & Castro, 2013; Bene et al., 2015). Gender considerations are crucial in coastal zone assessments and adaptation: women and men have different knowledge of coastal systems and different responsibilities defined by gender norms (e.g. women dominate close to shore and inland fishing and processing and men in off-shore fishing ) (UNDP & GWA, 2006).

**Harvey, N. (Ed.) (2006). *Global change and integrated coastal management: The Asia-Pacific region*. Dordrecht: APN/Springer. <https://books.google.co.uk/books?id=ElQPnFA9nagC&printsec=frontcover>**

What are the impacts of global change on coastal environments in the Asia-Pacific? The impacts of global warming and accelerated sea level rise are compounded by unsustainable use of coastal resources, population increases and urbanisation pressure, and coastal impacts from poor catchment management. This book identifies strategies to tackle such issues, including Integrated Coastal Zone Management.

**Adams, P., & Castro, J. (2013). *Embedding climate change resilience in coastal city planning: Early lessons from Cartagena de Indias, Colombia (Inside Stories on climate compatible development)*. Climate & Development Knowledge Network. <http://r4d.dfid.gov.uk/Output/192408/>**

How can coastal cities integrate planning for climate change with economic growth strategies and poverty reduction? This brief reports on the development of adaptation guidelines for Cartagena, Colombia, through a participatory planning process involving scientists, officials, politicians and citizens. An extensive vulnerability assessment highlighted risks including flooding, coastal erosion, and increased prevalence of disease. The guidelines highlight priority actions, and emphasise the importance of land-use planning and zoning policies as an entry point for adaptation. Lessons from the process include the importance of using climate science to help decision-makers weigh the costs of adaptation with the costs of inaction.

**FAO. (2013). *Climate-smart fisheries and aquaculture*. In *Climate Smart Agriculture Sourcebook (Module 10)*. Rome: FAO. <http://www.fao.org/3/a-i3325e.pdf>**

This module examines climate change impacts on fisheries and aquaculture and provides guidance on viable approaches to reduce risk. It emphasises the ecosystem approach. Recommendations include:

- improving efficiency measures, such as through incentives to maintain the resilience of aquatic systems and the communities that rely on them;
- gaining understanding to reduce the vulnerability of those most likely to be impacted;
- improving capacities for decision-making under uncertainty;
- improving fisheries management to increase output sustainably;
- increasing production efficiency;

- reducing post-harvest and production losses;
- developing regional trade; and
- monitoring to assess consequences and test responses.

Options for supporting these actions and case examples are provided.

**Bene, C., Devereux, S., & Roelen, K. (2015) *Social protection and sustainable natural resource management: Initial findings and good practices from small-scale fisheries* (FAO Fisheries and Aquaculture Circular No. 1106). Rome: FAO. <http://www.fao.org/3/a-i4620e.pdf>**

This publication explores how social protection and other measures can reduce vulnerability and strengthen resilience among households and communities involved in small-scale fisheries. Communities that depend on fisheries are among the socioeconomic groups most exposed to natural disasters, which occur mostly in South and Southeast Asia where the impact of climate change is expected to be greatest. While exposure to risks is high, ability to cope and recover is low. Vulnerability to climate-related risk among fisherfolk depends on social, economic and environmental factors such as the nature of the resource, methods of catch, market risks, and political and security risks. Recommendations include: assessments of risks; policy review (proposing new options as needed); flexible management and governance systems that can adjust to changing conditions; and adequate compensation when protective measures such as quotas and closed seasons are introduced.

**UNDP & GWA. (2006). *Resource guide: Mainstreaming gender in water management*. UNDP/GWA. [http://www.undp.org/content/undp/en/home/librarypage/environment-energy/water\\_governance/resource-guide-mainstreaming-gender-in-water-management.html](http://www.undp.org/content/undp/en/home/librarypage/environment-energy/water_governance/resource-guide-mainstreaming-gender-in-water-management.html)**

This resource guide assists practitioners in mainstreaming gender in 13 sub-sectors to facilitate access for specific purposes and water uses. For example, it covers water-related disasters, coastal zone management, fisheries, sanitation and hygiene, water supply and agriculture.

## 2.3. Reducing risk and building adaptive capacity

### Social protection

#### How is social protection affected by climate change?

Available evidence suggests climate change will have serious adverse long-term impacts on the lives of social protection beneficiaries, given the severity of shocks and the inadequacy of risk protection. Increases in climate change, and particularly climate-induced agricultural variability, are likely to increase the need for safety nets to prevent greater hunger and to improve household welfare (FAO, 2016). There are potentially strong complementarities between social protection instruments and climate-related interventions: both seek to minimise the risks faced by vulnerable people and promote resilience (Davies et al., 2008).<sup>10</sup>

Social protection has been identified as one of the priority strategies for adaptation in developing countries (FAO, 2016). However, evidence on the value of social protection for adaptation is still relatively limited, as is evidence of the impact of climate change on social protection programming (Davies et al., 2008). Yet available evidence shows how social protection programmes can increase people's resilience, such as by enhancing human capital (nutrition, health, education), promoting productive livelihoods (e.g. agricultural investments) and boosting the local economy (FAO, 2015; 2016).

<sup>10</sup> Social protection approaches include social assistance (e.g. cash transfers), public employment schemes, school meals, and micro-insurance and index-insurance (FAO, 2016).

Social assistance programmes contribute to household risk management and resilience. For example, beneficiaries are less likely to use negative coping strategies (e.g. reducing meals, selling off livestock) that can lead to long-term decline in household socioeconomic well-being (FAO, 2015; 2016). Given predictability and regularity in implementation, social protection instruments can support households to better manage risks and engage in more profitable livelihoods. When they are directed towards women, they not only empower women – they improve the welfare of the whole household because of women’s main care role (e.g. food, children’s education and well-being). UN Women, UNEP & UNDP (2013) note that **building the asset base of women** is particularly important in improving their adaptive capacity. Evidence from social protection initiatives indicates that when women have been given **financial decision-making power**, initiatives have been successful in achieving poverty reduction results.<sup>11</sup>

Experts broadly agree that considering climate change in social protection programme design is invaluable to address the multiple vulnerabilities and risks faced by poor and excluded communities (Leavy & Gorman, 2012; Davies et al., 2008). Social protection programmes may be made more robust in the context of climate variability and shocks by better aligning social protection, climate adaptation, and disaster risk reduction.

This principle underlies **adaptive social protection (ASP)**, which can reduce dependency on climate-sensitive livelihoods, address structural causes of poverty, and establish a longer-term perspective on the changing nature of stresses and shocks (Davies et al., 2009). Some social protection programmes use **environmental targeting criteria** (combining poverty and food security mapping and climate-related risk assessments), and some public works programmes include environmentally-friendly climate-resilient assets to reduce vulnerability (FAO, 2015). Climate-aware social protection should be scalable and flexible, include direct investments in livelihoods that build community and household resilience, and promote better climate risk management (Kuriakose et al., 2010).

**Davies, M., Oswald, K., Mitchell, T., & Tanner, T. (2008). *Climate change adaptation, disaster risk reduction and social protection: Briefing note*. Brighton: Centre for Social Protection/IDS.**  
[http://www.ids.ac.uk/files/IDS\\_Adaptive\\_Social\\_Protection\\_Briefing\\_Note\\_11\\_December\\_2008.pdf](http://www.ids.ac.uk/files/IDS_Adaptive_Social_Protection_Briefing_Note_11_December_2008.pdf)

This note reviews examples of social protection measures – cash transfers, weather-based crop insurance, employment guarantee schemes, asset transfers and social pensions – that can enhance the resilience of vulnerable communities. Social protection has much to offer in helping the poorest reduce their vulnerability to current (disaster risk reduction) and future (adaptation) climate shocks.

**Browne, E. (2014). *Social protection, climate change adaptation and disaster risk reduction (Rapid Literature Review)*. Birmingham, UK: GSDRC, University of Birmingham.**  
[gsdrc.org/publications/social-protection-climate-change-adaptation-and-disaster-risk-reduction/](http://gsdrc.org/publications/social-protection-climate-change-adaptation-and-disaster-risk-reduction/)

This report considers key issues and links between social protection, climate change adaptation and disaster risk reduction. CCA, DRR and social protection all address vulnerability. The adaptive social protection framework argues that interventions must be integrated to successfully mitigate vulnerability – CCA and DRR cannot address root causes of poverty and vulnerability, and social protection cannot change climate-dependent livelihoods. Key findings include:

- cash transfer impacts on climate change effects are poorly understood – further empirical analysis is needed;
- insurance appears to reduce risk for farmers and improve livelihoods and resilience, but evidence is drawn mainly from case studies without broader conclusions;

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<sup>11</sup> Expert comment. For more information see: Fiszbein, A., & Schady, N. (2009). *Conditional cash transfers: Reducing present and future poverty*. Washington, DC: World Bank. <http://hdl.handle.net/10986/2597>

- public works projects appear to have potential to reduce vulnerability, although the body of evidence is still lacking;
- social protection can help build and improve livelihoods, which contributes to adaptation by reducing vulnerability and increasing resilience – but causality from social protection to livelihoods to DRR and CCA is difficult to establish.

**FAO. (2016). *Climate change and food security: Risks and responses*. Rome: FAO.**

<http://www.fao.org/3/a-i5188e.pdf>

This paper provides an overview of the effects of climate change on food security and nutrition and explores ways to reduce negative impacts through adaptation and resilience. It shows how climate change impacts on a series of vulnerabilities – and presents ways to adapt and build resilience. The report suggests that reducing vulnerability and investing in resilience through social protection at household level is key to adaptation, as well as addressing gender-specific vulnerabilities. The report examines a range of actions needed and describes how to operationalise these interventions.

**Kuriakose, A., Heltberg, R., Wiseman, W., Costella, C., Cipryk, R., & Cornelius, S. (2010). *Climate-responsive social protection (Discussion Paper No. 1210)*. Washington, DC: World Bank.**

<http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/430578-1331508552354/1210.pdf>

Drawing on World Bank experience, this paper proposes a climate-responsive social protection framework. Key principles include climate-aware planning; livelihood-based approaches that take into account the full range of assets and institutions available to communities; and planning for the long-term to boost resilience. Four design features can help to achieve this: scalable and flexible programmes; climate-responsive targeting systems; investments in livelihoods that build community and household resilience; and the promotion of better climate risk management.

**FAO. (2015). *The state of food and agriculture: Social protection and agriculture – Breaking the cycle of rural poverty*. Rome: FAO.** <http://www.fao.org/3/a-i4910e.pdf>

This document contends that social protection can improve poor households' investment decisions by helping them manage risk (including climate-related). Social protection can increase the predictability of income and financial security, partially substituting for insurance, and providing liquidity. Social assistance programmes prevent households from falling into deeper poverty when exposed to shocks, while allowing for investment in productive activities and assets. Even relatively small transfers help the poor overcome liquidity and credit constraints, and provide insurance against risks that would otherwise deter them from higher-return activities. Social transfers also foster inclusion, facilitating participation in, and contribution to social networks, which help households cope with risk. Programmes that target women have stronger food security and nutrition impacts.

## **Social assistance**

A key objective of risk reduction is to build and protect the asset base of vulnerable communities. Conditional or unconditional cash transfers or social assistance in kind (e.g. food aid, in-kind vouchers) can reduce short-term vulnerability and stimulate **productive interventions** that encourage **livelihood diversification** (Davis and Oswald et al., 2008; Macours et al. 2012; FAO 2016).

**Arnold, C. (2011). *Cash transfers: Literature review*. London: DFID.**

<http://r4d.dfid.gov.uk/PDF/Articles/cash-transfers-literature-review.pdf>

This report synthesises global evidence on the impact of cash transfers – direct, regular and predictable non-contributory cash payments, such as child grants, which provide additional income to poor and vulnerable households. It draws on the findings of an independent review of DFID support to 24 social

transfer programmes in 16 countries, as well as an extensive literature review. There is strong evidence that cash transfers can *protect* living standards and *prevent* households from suffering shocks. They can also *promote* wealth creation and potentially *transform* relationships within society. Unconditional cash transfers can offer greater choice and flexibility for recipients. However, questions remain over key design and implementation issues such as whether to impose conditionality. Gender sensitive design is critical. Priorities for DFID policy and programmes include further exploration of the role of social protection in climate change adaptation.

**Godfrey Wood, R. (2011). *Is there a role for cash transfers in climate change adaptation?* Paper presented at International Conference on Social Protection for Social Justice, IDS, Brighton.**  
<http://www.ids.ac.uk/files/dmfile/GodfreyWood2011CashtransfersandclimatechangeadaptationCSPconference.pdf>

This paper assesses the potential of cash transfer programmes to contribute to adaptation goals in developing countries, particularly where existing social protection is inadequate. It argues that cash transfers are likely to contribute to adaptive capacity in many ways, including: meeting existing basic needs, thereby reducing short-term vulnerability; helping the poor respond to climate-related shocks; and reducing the pressure to engage in coping strategies that weaken long-term adaptive capacity. When compared to other adaptation options, cash transfers are supported by a substantial evidence base, have potential for scaling up, and are likely to gain local acceptance.

**Macours, K., Permand, P., & Vakis, R. (2012). *Transfers, diversification and household risk strategies: Experimental evidence with lessons for climate change adaptation (Policy Research Working Paper 6053)*. Washington, DC: World Bank.**  
<http://documents.worldbank.org/curated/en/2012/04/16239879/transfers-diversification-household-risk-strategies-experimental-evidence-lessons-climate-change-adaptation>

This article provides experimental evidence on the impact of the *Atención a Crisis* cash transfer programme in Nicaragua. The programme targeted agricultural households (primarily via women) in a drought-hit region from 2005 to 2006, aiming to provide an immediate safety net, while promoting poverty reduction and resilience through income diversification. The programme was experimental; households were randomly assigned to a control group or one of three treatment groups. All three treatment groups received Conditional Cash Transfers (CCT). Two groups received the same CCT plus a productive intervention – either vocational training or a grant to support productive investments. Household impacts were measured two years after programme closure. The productive interventions led to more diversification of economic activities and better protection from shocks compared to beneficiaries of the basic conditional cash transfers and control households. Households that received the productive investment grant also had higher average consumption levels. Results indicate that combining safety nets with productive interventions can help households manage future weather risks and promote longer-term impacts.

### **Risk transfer approaches**

Risk transfer approaches, including **index or weather-index insurance**,<sup>12</sup> are receiving increasing attention in the context of adaptation to climate change. They can provide timely pay-outs following extreme weather events, enable greater access to credit and other livelihood inputs, and provide space for long-term development planning (Hellmuth et al., 2009). Experts contend that weather-index insurance incentivises farmers to make productive management decisions – as a payment is received regardless of crop losses (Davies et al., 2008). It can also play a role at the macro level to insure

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<sup>12</sup> Weather-index insurance is an insurance scheme that responds to an objective parameter (e.g. a measure of rainfall or temperature) at a defined weather station, during an agreed time period (See WFP/IFAD 2011).



governments against natural disasters and provide financing for social protection programmes (IEG, 2012).

However, questions remain about the appropriateness, cost-effectiveness, and affordability of such measures and their effectiveness at targeting the most vulnerable. A comprehensive IEG (2012) evaluation finds that weather-index insurance has had **limited uptake at the household level**, except where heavily subsidised. A crucial **gender dimension** to programme design is that weather-index insurance programmes require participants to have ownership rights. Programmes should be designed so they can be purchased by women, who may lack land rights or ownership of livestock they rear (Meinzen-Dick et al., 2011).

**IEG. (2012). *Adapting to climate change: Assessing the World Bank Group experience: Phase III*. Washington, DC: IEG. [http://ieg.worldbankgroup.org/Data/reports/cc3\\_full\\_eval\\_0.pdf](http://ieg.worldbankgroup.org/Data/reports/cc3_full_eval_0.pdf)**

This independent evaluation draws lessons from World Bank experience in adaptation to current climate variability and adaptation to future climate change. Though progress has been made at the country level, the evaluation finds that operational systems to identify and mitigate climate risks are not in place at the project level. Important avenues for adaptation include innovative financial products for risk management, land use planning, and the development of a portfolio of new crop varieties. Recommendations include producing guidelines for incorporating climate risk management into project and programme design, and developing and piloting territorial and national-level measures of adaptation-related outcomes.

**Hellmuth, M. E., Osgood, D. E., Hess, U., Moorhead, A., & Bhojwani, H. (Eds). (2009). *Index insurance and climate risk: Prospects for development and disaster management (Climate and Society No. 2)*. New York: International Research Institute for Climate and Society. <https://iri.columbia.edu/wp-content/uploads/2013/07/Climate-and-Society-Issue-Number-2.pdf>**

This report draws on case studies and assesses the potential of index insurance to help manage climate variability. The report outlines key lessons and recommendations, concluding that index insurance has provided access to credit and insurance for high-risk populations previously considered uninsurable, and has contributed to economic development and poverty reduction. It has also played a role in providing more timely and reliable disaster relief.

**Meinzen-Dick, R., Johnson, N., Quisumbing, A., Njuki, J., Behrman, J., Rubin, D., Peterman, A., & Waitanji, E. (2011). *Gender, assets, and agricultural development programs: A conceptual framework (CAPRI Working Paper No. 99)*. Washington, DC: International Food Policy Research Institute. <http://www.ifpri.org/sites/default/files/publications/capriwp99.pdf>**

This paper reports that traditional crop insurance programmes usually protect only land holders, yet newer weather-based index insurance can be purchased by the landless. Nevertheless, when women are less involved in agriculture or weather shocks do not affect their assets directly, they may be less interested in paying for weather insurance. The paper offers a framework for understanding the gendered pathways of asset accumulation – men and women control, own, and dispose of assets in different ways, and usually have different kinds of assets. Several gender-specific hypotheses are raised:

- different types of assets enable different livelihoods, and a greater diversity of assets is associated with more diverse livelihoods and better well-being;
- men and women use different assets to cope with different types of risks and shocks;
- interventions that increase men’s and women’s stock of assets improve the bargaining power of the person who *controls* that asset; and
- interventions and policies that reduce the gender gap in assets support food and nutrition security, health, and well-being related to agency and empowerment.

## Adaptive social protection

Adaptive social protection (ASP) is an approach that aims to integrate social protection, climate change adaptation and DRR to improve household resilience and reduce vulnerability (Leavy & Gorman, 2012). ASP is designed with a long-term perspective, and emphasises transforming livelihoods to adapt to changing climate conditions (rather than simply coping). It is rooted in a rights-based approach and focuses on gender equality and on poverty and vulnerability reduction (Leavy & Gorman, 2012; Bee et al., 2013). However, evidence of ASP's effectiveness is limited (Davies et al., 2013; Béné et al. 2013).

**Davies, M., Béné, C., Arnall, A., Tanner, T., Newsham, A., & Coirolo, C. (2013). Promoting resilient livelihoods through Adaptive Social Protection: Lessons from 124 programmes in South Asia. *Development Policy Review*, 31(1): 27-58.**

<http://onlinelibrary.wiley.com/doi/10.1111/j.1467-7679.2013.00600.x/pdf>

To what extent are development interventions now integrating social protection, disaster risk reduction and climate change adaptation? This review of project documentation for 124 agricultural programmes in five countries in Asia shows that full integration is still relatively limited. When it does occur, it helps to shift the time horizon away from short-term protection of incomes, and towards a long-term transformation of livelihoods and social relations.

**Davies, M., Guenther, B., Leavy, J., Mitchell, T., & Tanner, T. (2009). *Climate change adaptation, disaster risk reduction and social protection: Complementary roles in agriculture and rural growth? (Working Paper 320)*. Brighton: IDS.**

[http://onlinelibrary.wiley.com/doi/10.1111/j.2040-0209.2009.00320\\_2.x/abstract](http://onlinelibrary.wiley.com/doi/10.1111/j.2040-0209.2009.00320_2.x/abstract)

What is the role of social protection and Disaster Risk Reduction (DRR) in climate adaptation? Drawing on qualitative evidence, this article finds that integrating social protection, DRR and climate adaptation can bolster local resilience and help address the causes of poverty and vulnerability in a rural context. The paper suggests that social protection programmes can be made resilient to climate change impacts by reducing dependency on climate-sensitive livelihood activities. An 'adaptive social protection' approach is recommended. This aims to address structural causes of poverty and incorporates a rights-based rationale to address social exclusion.

**Béné, C., Cannon, T., Davies, M., Newsham, A., & Tanner, T. (2013). *Social protection and climate change*. Paris: OECD.**

[http://search.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DCD/DAC/ENV\(2013\)2&docLanguage=En](http://search.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=DCD/DAC/ENV(2013)2&docLanguage=En)

What progress has been made on Adaptive Social Protection in recent years? This paper provides a condensed review of current knowledge about the role of social protection in reducing the impact of climate change on the poorest populations. Recommendations for donors are proposed regarding five types of intervention: cash transfers, pension schemes, weather indexed micro-insurance, public works, and asset transfers. The concept of 'resilience' has recently emerged as a new policy narrative that can help integrate social protection, disaster risk reduction, and climate change adaptation. More evidence-based analysis is required to understand in detail how social protection programmes affect adaptive capacity.

**Leavy, J., & Gorman, C. (2012). *Realising the potential of adaptive social protection (IDS in Focus Policy Briefing Issue 28)*. Brighton: IDS.**

<http://www.ids.ac.uk/publication/realising-the-potential-of-adaptive-social-protection>

Through an analysis of survey data, this brief highlights the differences and similarities between social protection, climate change adaptation and disaster risk reduction. Key findings include that climate change is increasing uncertainty in programme planning and is expected to have serious impacts on the

lives of social protection beneficiaries, and that social protection is a key instrument for building disaster- or climate-resilience livelihoods.

**Bee, B., Biermann, M., & Tschakert, P. (2013). Gender, development and rights-based approaches: Lessons for climate change adaptation and adaptive social protection. In M. Alston & K. Whittenbury (Eds.), *Research, action and policy: Addressing the gendered impacts of climate change*. Netherlands: Springer. [http://link.springer.com/chapter/10.1007/978-94-007-5518-5\\_7](http://link.springer.com/chapter/10.1007/978-94-007-5518-5_7)**

This chapter examines the links between gender, development, and right-based approaches to highlight the possibilities and pitfalls of such an approach to adaptation. It emphasises social responsibilities to and for others, and the potential for promoting adaptation that values differential skills, assets, expertise, and voices while acknowledging the limits of autonomous actors in adaptation.

## Disaster Risk Reduction (DRR)

### Disaster Risk Reduction and climate adaptation

The United Nations International Strategy for Disaster Reduction (UNISDR) defines Disaster Risk Reduction (DRR) as ‘the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the casual factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events’.<sup>13</sup>

Both human and environmental factors are important causes of extreme weather events and increasing variability (IPCC, 2012; Mercer, 2010). The severity of the impacts of extreme weather events strongly depends on exposure and vulnerability (IPCC, 2012). Human factors are often the most significant determinants of disaster risk; **settlement patterns, urbanisation** and **socioeconomic conditions** have an observed influence on exposure and vulnerability (IPCC, 2012). **Inequalities** can exacerbate disaster risk, weakening adaptive capacity (IPCC, 2012). Tackling inequalities can thus improve disaster risk strategies. Extreme weather events will have greater impacts on sectors closely linked to climate, such as water, agriculture and food security, and health (IPCC, 2012). But exposure to risk is also high in urban contexts, notably in peri-urban slum areas that can be particularly exposed to climate-induced disasters (World Bank 2010; Reichlin & Shaw, 2015).

DRR shares with climate adaptation the aim of reducing the impact of shocks by anticipating risks and addressing vulnerabilities. However, it differs in its focus. DRR emphasises extremes, includes geophysical risks, and tends to build on past on experience and local knowledge. Climate adaptation responses focus more on scientific projections of future impacts.

Nevertheless, there is increasing recognition of the merits of greater **collaboration** across the two fields (Mercer, 2010; Shamsuddoha et al., 2013; IPCC, 2012). For instance, DRR tools that predict hazards are highly relevant for adaptation to extreme weather events, while climate-related losses could be reduced through widespread implementation of DRR measures. Despite the benefits of integrating the two approaches, **challenges** exist, including: the large number of different actors involved in DRR and adaptation; tension between short-term funding for DRR and long-term funding needed for adaptation; and limited capacity to predict extreme events linked to climate change.

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<sup>13</sup> See: <http://www.unisdr.org/we/inform/terminology#letter-d>

**Mercer, J. (2010). Disaster risk reduction or climate change adaptation: Are we reinventing the wheel? *Journal of International Development*, 22(2): 247-264.**

<http://onlinelibrary.wiley.com/doi/10.1002/jid.1677/abstract>

Are disaster risk reduction (DRR) and climate change adaptation (CCA) essentially the same? This paper draws on fieldwork in three communities in Papua New Guinea to question the reasoning behind a separation of the two agendas of DRR and CCA. The case study shows that climate change is just one factor among many contributing to community vulnerability. Climate change should not be considered a stand-alone issue, but rather incorporated into wider DRR strategies within a holistic approach to sustainable development. A narrow focus on CCA would not adequately address the development concerns of communities.

**Shamsuddoha, M., Roberts, E., Hasemann, A., & Roddick, S. (2013). *Establishing links between disaster risk reduction and climate change adaptation in the context of loss and damage: Policies and approaches in Bangladesh*. London: Climate & Development Knowledge Network.**

<http://r4d.dfid.gov.uk/pdf/outputs/CDKN/bangladesh-risk-policy.pdf>

How can disaster risk reduction (DRR) and climate change adaptation (CCA) efforts work together to address potential loss and damage from climate change? This paper draws on literature and key informant interviews to analyse DRR and CCA policies, strategies, institutions and approaches in Bangladesh. It highlights the challenges arising from rigid bureaucratic demarcation of responsibility for CCA and DRR, recommends practical reforms to institutional structures and systems, and calls for a more collaborative and cooperative approach to DRR and CCA in order to address loss and damage within national policy processes.

## Approaches to DRR

The Hyogo Framework for Action 2005-2015 highlights the importance of **institutions** and their capacities in contributing to disaster response processes, building community disaster resilience, and integrating DRR in development planning (FAO, 2008; IPCC, 2012). Long-term planning (at national level and across sectors) is recognised as important for DRR (FAO, 2008; IPCC, 2012). Appropriate institutional structures and timely risk **communication strategies** are important to ensure effective adaptation and disaster risk management (World Bank, 2010). In addition, **preventative measures**, including early warning systems, critical infrastructure, and environmental buffers, are vital to building resilience (World Bank, 2010). Investment in early prevention is recommended, for example during urbanisation and in designing new infrastructure to avoid introducing new risks (World Bank, 2010; IWPR, 2015).

**Gender mainstreaming** and promoting women's engagement in DRR are identified as essential, as women's knowledge and livelihood strategies tend to differ from those of men. Gender-sensitive DRR approaches will strengthen climate adaptation strategies (UNISDR, 2007). Women and girls have unique vulnerabilities arising from social norms, which affect their ability to survive and cope with natural disasters (IWPR, 2015). Experts also caution that women and girls are more susceptible to sexual exploitation in a post-disaster context (Plan International, 2011; IPCC, 2012; Reichlin & Shaw, 2015). Women and girls are typically marginalised from decision-making fora, and discriminated against in post-disaster recovery and reconstruction efforts – yet their active participation has been shown to improve the effectiveness of disaster prevention, relief, recovery and reconstruction (IPCC, 2012; IWPR, 2015).

Effective strategies tend to involve a portfolio of different actions that aim to reduce risk. **Local knowledge** is vital in identifying existing approaches, capacity and shortcomings (IPCC, 2012; FAO, 2008). Many DRR approaches rely on practical **community-based tools** based on people-centred and holistic livelihoods perspectives to plan and implement interventions.

**IPCC. (2012). *Managing the risks of extreme events and disasters to advance climate change adaptation. A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change.* Cambridge, UK and New York: Cambridge University Press.**

[http://ipcc-wg2.gov/SREX/images/uploads/SREX-All\\_FINAL.pdf](http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf)

How can the risks and impacts of climate change and extreme climate events be managed and minimised? This report brings together evidence from both climate scientists and experts on disaster risk management, and assesses how exposure and vulnerability to weather and climate events determine impacts and the likelihood of disasters. Disaster risk emerges from the interaction of physical risk factors, such as extreme climate events, and the human risk factors of exposure and vulnerability. Human factors are often more important drivers of disaster risk than physical factors. The most effective approaches to adaptation and disaster risk reduction are those that offer development benefits in the relatively near term, as well as reductions in vulnerability over the longer term.

**FAO. (2008). *Disaster risk management systems analysis: A guide book.* Rome: FAO.**

<http://www.fao.org/3/a-i0304e.pdf>

This guide provides tools and methods to assess existing structures and capacities of institutions concerned with Disaster Risk Management (DRM) to improve their effectiveness and integration with development planning. The guide's focus is on designing and promoting Community-Based Disaster Risk Management (CBDRM), and mainstreaming DRM into development and sectoral planning. It adopts a sustainable livelihoods approach to identify which types of households are most prone to vulnerability. The links between shocks, vulnerabilities and households' assets and coping strategies are examined. The framework puts households and livelihoods at the centre, with attention to assessing differences among socioeconomic groups.

**UNISDR. (2007). *Gender perspective: Working together for disaster risk reduction – Good practices and lessons learned.* Geneva: UNISDR. [http://www.unisdr.org/files/547\\_gendergoodpractices.pdf](http://www.unisdr.org/files/547_gendergoodpractices.pdf)**

Gender mainstreaming and full and balanced participation of women and men, girls and boys make disaster risk reduction efforts more effective. This report presents 15 practices that advance gendered resilience building – a key principle that informs the implementation of the Hyogo Framework for Action. Each practice can be replicated and empowers women to build resilience in their communities.

**Institute for Women's Policy Research. (2015) *Gender, urbanisation and democratic governance.* Washington, DC: National Democratic Institute.**

<https://www.ndi.org/Gender-Urbanization-and-Democratic-Governance-white-paper>

This paper outlines challenges faced by urban women, showing how policy and design overlook their experiences and largely preclude their participation in decision making. Women and girls are more likely to live in urban poverty and face increased risks from environmental hazards and climate change – particularly those living in informal settlements. Natural disasters affect women and men differently. Impacts on women include: disruption in paid work; difficulties in recovering (e.g. limited access to financial support); heightened financial insecurity; difficulties in accessing public services, lack of communication and information; and heightened personal insecurity. Since disasters are steadily increasing, cities have a responsibility to understand and improve their capacity to mitigate and respond to women and girls' experiences and incorporate their views in managing humanitarian relief.

**Plan International. (2011). *Weathering the storm: Adolescent girls and climate change.* Woking, UK: Plan International. <http://www.plan-uk.org/resources/documents/35316/>**

Drawing on empirical field research, this report notes that girls and women are more susceptible to sexual exploitation in the aftermath of disasters. Identified risk factors include being orphaned or separated from their parents, staying in temporary shelters, using unsafe latrines, or collecting water or

firewood. Girls are also at risk of child marriage, prostitution, and increases in sexually transmitted infections, including HIV.

**World Bank. (2010). *Natural hazards, unnatural disasters: The economics of effective prevention*. Washington, DC: World Bank. [gfdrr.org/sites/gfdrr.org/files/nhud/files/NHUD-Report\\_Full.pdf](http://gfdrr.org/sites/gfdrr.org/files/nhud/files/NHUD-Report_Full.pdf)**

Earthquakes, droughts, floods and storms are natural hazards, but the 'unnatural disasters' are deaths and damage that result from human acts of omission and commission. This report emphasises economic aspects of disaster risk management, combining literature review, case studies, and empirical analysis. It finds that prevention pays, and that three measures are particularly important: early warning systems, critical infrastructure and environmental buffers. Insurance and other coping mechanisms are also vital. Climate change and rapid urbanisation are both altering the disaster risk landscape, highlighting the importance of early investment in prevention.



### 3. Climate change adaptation and mitigation programmes: social development approaches in programme design and implementation

Mainstreaming social development approaches will add value to climate adaptation and mitigation programme design and implementation (Morchain & Kelsey, 2016; Mearns & Norton, 2010; FAO, 2012). Using social analysis during design, programme support and evaluation broadens and deepens understanding of the contextual changes in the socioeconomic environment, including livelihoods and overall development over time (FAO, 2011). **People-centred, inclusive approaches** built on interdisciplinary and holistic perspectives generate more relevant, effective and sustainable programmes (FAO, 2011). They are rooted in the realities of the existing situation, capturing dynamics of poverty, socioeconomic and environmental conditions and hazards, and processes shaping social diversity and gender relations (FAO, 2011). A social development approach focuses on **community empowerment and rights**, critical aspects in addressing the impacts of climate change on development (Mearns & Norton, 2010). Gender-sensitive, participatory approaches such as territorial development and landscape management can be included in adaptation interventions (FAO, 2013; World Bank, FAO & IFAD, 2015).

This section provides tools and examples for integrating social development, and specifically social analysis, in climate change adaptation and mitigation programmes. It comprises three main sections:

- social analysis during design;
- integration of social dimensions and participatory approaches in climate change adaptation and mitigation interventions; and
- participatory M&E approaches for climate change adaptation and mitigation programmes.

#### 3.1 Social analysis during design

Conducting a social analysis at the start of programme design is critical to identifying and characterising the effects and impacts of climate change and climate variability in a given area. This analysis should be cast with a wide net, covering all relevant sectors, populations and livelihoods. For example, these might include agriculture (i.e. farming, forestry, fisheries), food security and welfare indicators. Vulnerability and resilience are influenced by many factors (e.g. biophysical, social, economic, political, institutional and technological structures and processes), so social-ecological systems should be assessed using a multidimensional approach. This provides a holistic view in which climate projections are only one part of the assessment of threats to social and environmental resources (FAO, 2013: Module 18; FAO, 2011).

Analyses should identify the most vulnerable locations and contexts in need of adaptation and mitigation interventions, particularly causes of vulnerability and potential benefits of programme interventions on the most vulnerable (FAO, 2013: Module 18; FAO, 2011). **Bottom-up, holistic, context-driven approaches** are recommended, including community-based participatory methods that take into account both climatic and non-climatic local features. **Community participation** in assessments is vital – not only for gathering information by drawing on diverse views, but also for building community ownership of the process to increase the likelihood of successful implementation and sustainability of interventions. Participatory methodologies have been shown to be critical for understanding the dynamics of vulnerability to climate change and identifying sources of resilience (Moser et al., 2010). Assessments based on social analysis can also help identify baseline indicators that incorporate socioeconomic, livelihood and equity factors.

**FAO. (2011). *Social analysis for agriculture and rural investment projects*. Rome: FAO.**

<http://www.fao.org/docrep/014/i2816e/i2816e00.htm>

This series of three guides focuses on applying social analysis (SA) in the design, support and evaluation of agricultural and rural investment programmes, including climate change adaptation. The guides' main messages are that use of SA will generate more relevant, inclusive, and sustainable programmes because it facilitates greater understanding of the socioeconomic environment, livelihoods and people's development challenges and priorities. Social analysis is seen as essential for assessing the complexities of social diversity, gender and dimensions of poverty. This type of analysis prioritises social attitudes and perceptions, processes, behaviours and experiences, and aims to reflect beneficiary priorities in programme design, which also builds local ownership. An inter-disciplinary and holistic approach using a sustainable livelihoods framework is recommended. The series includes a guide for managers, practitioners, and a practical field guide with an extensive set of tools.

**Moser, C., Norton, A., Stein, A., & Georgieva, S. (2010). *Pro-poor adaptation to climate change in urban centres: Case studies of vulnerability and resilience in Kenya and Nicaragua*. Washington, DC: World Bank.** [http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1232059926563/5747581-1239131985528/ESW\\_propoorurbanadaptationReport4947GLBweb2.pdf](http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/244362-1232059926563/5747581-1239131985528/ESW_propoorurbanadaptationReport4947GLBweb2.pdf)

What are poor households, small businesses and communities doing to cope with climate change impacts? This report presents a methodology for identifying and analysing vulnerability to extreme weather events, and sources of resilience. This has three components: a participatory climate change adaptation appraisal methodology (PCCAA); an urban level rapid risk and institutional appraisal (RRIA); and a consultation and validation process with stakeholders from government, civil society and local communities.

**Chindarkar, N. (2012). *Gender and climate change-induced migration: proposing a framework for analysis*. *Environmental Research Letters*, 7(2).**

[http://iopscience.iop.org/1748-9326/7/2/025601/pdf/1748-9326\\_7\\_2\\_025601.pdf](http://iopscience.iop.org/1748-9326/7/2/025601/pdf/1748-9326_7_2_025601.pdf)

This paper proposes frameworks to analyse the gender dimensions of climate change-induced migration. The experiences, needs and priorities of climate migrants will vary by gender, and these differences need to be considered if policies are to be inclusive. Among the vulnerable groups, women are likely to be disproportionately affected by climate change because on average women tend to be poorer, less educated, less healthy and have limited direct access to or ownership of natural resources. Both the process of climate change-induced migration (actual movement) and its outcomes (rural-rural or rural-urban migration, out-migration mainly of men) are also likely to be highly gendered.

**Morchain, D., & Kelsey, F. (2016). *Finding ways together to build resilience: the vulnerability and risk assessment methodology*. Oxford: Oxfam GB** <http://policy-practice.oxfam.org.uk/publications/finding-ways-together-to-build-resilience-the-vulnerability-and-risk-assessment-593491>

Oxfam's Vulnerability and Risk Assessment (VRA) tool adopts a holistic, landscape-wide participatory approach to assessing vulnerability. The tool helps stakeholders from various levels to jointly identify and analyse root causes of vulnerability for distinct social groups. Based on this assessment, users are led through a process to design programmes and risk reduction initiatives ensuring that they are equitable, gender-sensitive and effective. The VRA design process emphasises historical and evolving power dynamics, through convening of a 'Knowledge Group' to inspire and drive the analysis. Vulnerable people, especially women, are rarely able to access support they require to manage risks; this is central to VRA, which systematically includes women in the assessment process.

**World Bank. (2012). Poverty and social impact analysis for climate change: Development policy and operations. Washington, DC: World Bank.**

<http://documents.worldbank.org/curated/en/2012/01/15763719/poverty-social-impact-analysis-climate-change-development-policy-operations>

This guidance note draws on World Bank experience to address the why, who, what and how of conducting poverty and social impact analysis (PSIA) in the context of climate change development policy and operations. PSIA provides an understanding of vulnerability, marginalisation, accountability and voice. The report is based on the premise that integrating a strong social perspective into climate change policies and strategies contributes to effective, pro-poor actions. PSIA is a systematic approach to analysing the distributional impact of policy reforms and programmes on the welfare of different stakeholder groups (rural, urban, gender etc.), with particular focus on the poor and vulnerable. Highlighting social risks and opportunities enables more accurate assessment of the true costs of mitigating and adapting to climate change, and helps target support effectively. Challenges include the need to draw from new tools and techniques when measuring distributional impacts, as availability, reliability and quality of climate change data varies across sectors and countries.

**CARE International. (2010). Toolkit for integrating climate change adaptation into development projects (Digital Toolkit – Version 1.0 – July). London: CARE International.**

[www.careclimatechange.org/files/toolkit/CARE\\_Integration\\_Toolkit.pdf](http://www.careclimatechange.org/files/toolkit/CARE_Integration_Toolkit.pdf)

This toolkit provides guidance for integrating climate change adaptation into the design, implementation, monitoring and evaluation of development projects. It is structured in a step-by-step approach – aiming to ensure climate-resilient projects have sustainable impacts. The toolkit includes checklists to ensure development activities do not increase people's vulnerability to climate change, recommended tools for all stages of the project cycle, and practical examples from CARE projects worldwide, including water resource management and agriculture projects. It includes guidance on analysing vulnerability among intended beneficiaries. Understanding who is vulnerable and why requires a context-specific analysis of biophysical, socioeconomic and political dimensions of vulnerability.

**Dubois, K. M, Chen, Z., Kanamaru, H., & Seeburg-Elverfeldt, C. (2012). Incorporating climate change considerations into agricultural investment design: A guidance document. Rome: FAO.**

<http://www.fao.org/docrep/016/i2778e/i2778e.pdf>

This guide covers incorporating climate change into the design as well as all stages of the programme cycle of agricultural investment programmes (defined as farming, fisheries, livestock and forestry) and stand-alone climate change programmes. A key recommendation is to conduct a comprehensive social analysis during design. Recommendations also include adopting demand-driven, location-specific approaches, and participatory methods that integrate gender-specific vulnerabilities, needs and capabilities as well as priorities of indigenous people and vulnerable communities. To implement a social analysis approach, the series 'Social analysis for agriculture and rural investment projects' (FAO, 2011) is recommended (see above).

**Browne, E. (2014). Gender in political economy analysis (GSDRC Helpdesk Research Report).**

**Birmingham: GSDRC, University of Birmingham.** <http://www.gsdrc.org/docs/open/hdq1071.pdf>

Gender analysis focuses on power relations between men and women and adds to political economy analysis (PEA) a more accurate understanding of interests, needs, and resource and labour allocation. This report covers gender-focused questions common in PEA tools around issues of roles, power and representation. It looks in particular at: Sida's power analysis, Strategic Governance and Corruption Analysis, DFID's Drivers of Change approach, and Problem-Driven Governance and Political Economy Analysis.

## 3.2 Integration of social dimensions and participatory approaches

### FAO E-learning tool – Planning for Community-based Adaptation to Climate Change

<http://www.webgeo.de/fao-webgeo-2-intro/>

This interactive e-learning course provides practical resources for training and undertaking assessments and planning for community-based adaptation to climate change, with particular focus on the rural agricultural sector. It covers key concepts, participatory tools, analytical steps, and approaches used in the field. Its themes include local context, with emphasis on rural livelihoods among different socioeconomic groups, food security, and incorporating local knowledge. The sustainable livelihood framework is a key analytical approach used to assess vulnerability and people's coping strategies. The course covers steps to design, implement and monitor community-based adaptation action plans.

**World Bank. (2010). Ecosystem-based adaptation: Reducing vulnerability. In *Convenient solutions to an inconvenient truth: Ecosystem-based approaches to climate change* (ch. 3). Washington, DC: World Bank.** <http://hdl.handle.net/10986/2686>

This paper contends that societies need to invest in preserving and restoring local ecosystems to act as natural barriers against extreme weather events and climate conditions. Ecosystem-based approaches are low-cost, long-proven, and low-technology solutions to many anticipated climate change impacts. They can complement existing adaptation efforts, and better engage local communities in protecting their environments.

**FAO. (2012). *Improving Gender Equality in Territorial Issues (IGETI): Integrated guidelines (Land and Water Division Working Paper 3)*. Rome: FAO.** <http://www.fao.org/docrep/016/me282e/me282e.pdf>

This guide is based on the Participatory and Negotiated Territorial Development (PNTD) approach (FAO, 2005).<sup>14</sup> PNTD is a facilitated process of dialogue and negotiation among stakeholders resulting in a socially-legitimate agreement on the development of their territory. It is particularly appropriate during periods of stress, e.g. climate change, conflict, migration. Power relations are critical, and asymmetries of power are addressed in the process – the powerless and most vulnerable are especially supported to engage with equal voice. This guide combines PNTD with the Socioeconomic and Gender Analysis approach,<sup>15</sup> which examines gender roles, responsibilities and relations, taking into account economic and social opportunities associated with factors such as age, ethnicity and religion. The IGETI guide outlines steps for implementation, involving: (i) participatory gender-sensitive territorial diagnostics (e.g. context, gender roles, causes and effects of environmental stress); (ii) negotiation, review of gender-sensitive proposals and consensus building; and (iii) attaining agreements and monitoring. Guidance on using gender-sensitive field tools is included.

**FAO. (2013). *Managing landscapes for climate-smart agriculture. In Climate smart agriculture: Sourcebook (module 2)*. Rome: FAO.** <http://www.fao.org/docrep/018/i3325e/i3325e00.htm>

This module describes the landscape approach within areas large enough to produce vital ecosystem services but small enough to be managed by land users. It is a people-centred approach based on consensus around landscape management. The approach is multi-sectoral, engages multiple stakeholders and operates on different scales. The module covers stakeholder negotiations and planning, policy and finance options, and the importance of monitoring. Case studies of landscape approaches are provided – and an accompanying booklet<sup>16</sup> gives examples of climate adaptation responses in diverse contexts.

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<sup>14</sup> <http://www.fao.org/3/a-ak228e.pdf>

<sup>15</sup> <http://www.fao.org/gender/seaga/seaga-home/en/>

<sup>16</sup> <http://www.fao.org/3/a-i3817e.pdf>

**World Bank, FAO, & IFAD. (2015). *Gender in Agriculture Sourcebook: Module 18. Gender in climate-smart agriculture* (first published 2009). Washington, DC: World Bank.**

<https://openknowledge.worldbank.org/handle/10986/22983>

The module includes guidance and tools for integrating gender in planning, design, implementation, and evaluation of programmes and investments related to climate-smart agriculture (CSA). Understanding that climate change affects men and women differently and that social differences, particularly gender inequality, must be analysed is vital. Women are key players in agriculture, yet they own fewer assets (e.g. land and inputs) and access fewer financial and extension services than men. The module covers: gender-sensitive climate-smart technologies; gender-sensitive landscape approaches; M&E of gender inclusion through the CSA project cycle; household and community-driven development; and the role of institutions in gender-responsive CSA. Innovative CSA activities are also discussed, including ICTs, private sector alliances, and fisheries processing.

### 3.3 Participatory monitoring and evaluation approaches

Measuring the effectiveness of integrated climate change and social development programmes is inherently complex. It can be difficult to attribute effects to interventions, which may cross multiple sectors and be implemented at different scales (household to national) over several timescales by different stakeholders. Also, interventions may have unintended consequences. Robust participatory analyses to inform programme design can identify baseline indicators across a **multi-dimensional** spectrum of attributes (e.g. socioeconomic, livelihood, and environmental variations) that reflect vulnerability and resilience changes over time. It is vital that data is **disaggregated by gender and beneficiary group** to capture changes experienced by different types of stakeholders (Bourse et al., 2014; FAO, 2013: Module 18). Social factors such as local perceptions of climate adaptation and social and cultural values should be included in M&E frameworks (Villanueva, 2010). Mixed-methods approaches are useful in capturing a full understanding of what, how and why changes occurred.

**Brooks, N., Anderson, S., Ayers, J., Burton, I., & Tellam, I. (2011). *Tracking adaptation and measuring development* (Climate Change Working Paper 01). London: IIED. <http://pubs.iied.org/10031IIED.html>**

This paper presents a framework for adaptation programming, including potential indicators or indicator categories/types for tracking and evaluating the success of adaptation support and interventions. The framework evaluates the quality and extent of climate risk management processes and the associated development and adaptation outcomes, across all scales from local to global. It models how local development interventions affect national and regional development and adaptation, and how high-level climate risk management interventions affect climate risk management at the national and local levels.

**FAO. (2013). *Assessment, monitoring and evaluation*. In *Climate-smart agriculture sourcebook (module 18)*. Rome: Italy. <http://www.fao.org/3/a-i3325e.pdf>**

This module focuses on conducting assessments for programme design and monitoring and evaluation frameworks for the adoption of climate-smart agriculture (CSA) and climate change adaptation more generally. Recommended approaches emphasise incorporating contextual, multidimensional, multi-sectoral, gender-sensitive perspectives focused on a broad set of social, livelihood and environmental dimensions. Specific challenges are raised, and guiding principles provided.

**Carter, T. R., Parry, M. L., Harasawa, H., & Nishioka, S. (1994). *IPCC technical guidelines for assessing climate change impacts and adaptations*. London: UCL/Centre for Global Research.**

<https://www.ipcc.ch/pdf/special-reports/ipcc-technical-guidelines-1994n.pdf>

The IPCC provides a study framework to assess the impacts of, and adaptations to, climate change in different geographical areas, economic sectors and countries. A seven-step process is advocated: defining

the problem; selecting methods; testing the method; selecting scenarios; assessing biophysical and socioeconomic impacts; assessing autonomous adjustments; and evaluating adaptation strategies.

**International Fund for Agricultural Development. (2002). *Managing for impact in rural development: A guide for project M & E*. Rome: IFAD.**

<https://www.ifad.org/documents/10180/17b47fcb-bd1e-4a09-acb0-0c659e0e2def>

This guide provides extensive advice on how M&E can support project management and engage project stakeholders in understanding, learning from, and improving project progress, and on how to develop participatory M&E systems. It includes step-by-step processes to establish an M&E system of development programmes, with gender and socioeconomic dimensions as cross-cutting issues.

**Villanueva, P. S. (2010). *Learning to ADAPT: monitoring and evaluation approaches in climate change adaptation and disaster risk reduction – challenges, gaps and ways forward* (Strengthening Climate Resilience Discussion Paper No. 9). Brighton: IDS.**

<http://community.eldis.org/.59d49a16/Learning-to-ADAPT.pdf>

The paper explores limitations and challenges of current disaster risk reduction M&E efforts, including in understanding the factors that enable or constrain adaptation and in building an evidence base of progress. It sets out ADAPT (Adaptive, Dynamic, Active, Participatory, Thorough) principles for developing M&E frameworks for adaptation and disaster risk management interventions. These enable flexibility, account for uncertainty and complexity and encourage understanding of links between capacity, action and people's driving forces towards change. The approach incorporates experience-based learning to capture insights into adaptive capacity and its links to risk and vulnerability reduction. Emphasis is on understanding social, cultural and personal issues, including values, confidence, motivation, risks, perceptions, decision-making, and cultural and behavioural factors that promote or constrain adaptation.

**Bours, D, McGinn, C. & Pringle, P. (2014). *Design, monitoring, and evaluation in a changing climate: Lessons learned from agriculture and food security programme evaluations in Asia* (Evaluation Review 1). Phnom Penh and Oxford: SEA Change COP and UKCIP <http://www.ukcip.org.uk/wp-content/PDFs/UKCIP-SeaChange-MandE-ER1-agriculture.pdf>**

This report distils findings and lessons from evaluations of climate change-related interventions across Asia. M&E examples incorporate qualitative methods and participatory approaches and emphasise capturing differences in populations' vulnerabilities and resilience. Lessons include:

- social structures and institutions profoundly shape vulnerability and resilience to climate change;
- adaptation strategies need to build on nuanced 'differentiated' analyses that capture climate change's varying effects on distinct population groups, such as ethnic minorities and women;
- vulnerable groups may be vulnerable 'differently' from the wider community; and
- the poorest and most marginalised have less access to resources needed to cope effectively – their needs may be overlooked.

**World Bank (2010) *Monitoring and evaluation of adaptation activities* (Mainstreaming adaptation to climate change in agriculture and natural resources management projects guidance note 8). Washington, DC: World Bank.**

<http://siteresources.worldbank.org/EXTTOOLKIT3/Resources/3646250-1250715327143/GN8.pdf>

This brief note covers selection of indicators and considerations for logframe development, and best practices for establishing an M&E system. It covers incorporating both social and economic factors. For example, baseline data suggestions include data on well-being, perceptions of hope, social networks, conflict, access to services, migration, and institutions. It recommends participatory approaches, and provides a compendium of resources including toolkits.