SPACE

Social Protection Approaches to COVID-19: Expert Advice

Social protection and climate change: scaling up ambition

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May 2021

Suggested citation: Costella, C., McCord, A., van Aalst, M., Holmes, R., Ammoun, J., Barca, V. (2021) ' Social protection and climate change: scaling up ambition', Social Protection Approaches to COVID-19 Expert Advice Service (SPACE), DAI Global UK Ltd, United Kingdom

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This document was developed alongside others in the SPACE series (all available here).

SPACE is a joint initiative of FCDO's Better Assistance in Crises (BASIC) and Gender Responsive Social Protection (GSP) programmes (funded by UKAid); GIZ (funded by the German Federal Ministry for Economic Cooperation and Development); and the Australian Government through the Department of Foreign Affairs and Trade (DFAT). SPACE materials do not necessarily represent FCDO, or GIZ or DFAT's own views or policies or commit FCDO, GIZ or DFAT to any particular course of action.

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List of abbreviations

GDP	Gross Domestic Product
GESI	Gender Equality and Social Inclusion
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
HIC	High-Income Countries
HSNP	Hunger Safety Net Program
IFRC	International Federation for Red Cross
ILO	International Labour Organisation
IPCC	International Panel on Climate Change
KPI	Key Performance Indicator
LMIC	Low- and Middle-Income Countries
M&E	Monitoring and Evaluation
MIS	Management Information System
NDC	Nationally Determined Contributions
NRM	Natural Resource Management
PES	Payment for Environmental Services
PSNP	Productive Safety Net Program
PWP	Public Works Programme
SDG	Sustainable Development Goal
UNFCCC	United Nations Framework Convention on Climate Change

Glossary

Climate change adaptation: In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects.

Climate change mitigation: A human intervention to reduce emissions or enhance the sinks of greenhouse gases.

Climate risk: Climate risks refer to the possible impacts resulting from the interplay of hazards, exposure, and vulnerability.

Exposure: The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected [by a hazard].

Hazard: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.

Labour market interventions: Labour market interventions are government programmes that intervene in the labour market to help the unemployed find work.

Poverty: At the simplest level, individuals or families are considered poor when their level of living, measured in terms of income or consumption, is below a particular standard

Social assistance: Social assistance is the non-contributory, tax-financed benefit delivered to the most vulnerable, to avert poverty and deprivation.

Social insurance: Social insurance comprises contributory schemes financed by employers and workers, sometimes subsidised by states, aimed at covering vulnerabilities like unemployment.

Social protection: Social protection can be defined as “public actions taken in response to levels of vulnerability, risk and deprivation, which are deemed socially unacceptable within a given polity and society” (Conway et al., 2000). The International Labour Organization (ILO) defines it as “set of policies and programmes designed to reduce and prevent poverty and vulnerability throughout the life cycle” (ILO, 2017).

Social risk: Social risks are potential negative consequences that may affect individuals or communities arising due to loss of livelihoods and income insecurity.

Vulnerability: The propensity or predisposition [of an exposed person or system] to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

1. Introduction

Climate change, once perceived as a long-term environmental issue, is now an immediate threat to safety and prosperity, especially for the most vulnerable people that are hit hardest by increasing weather extremes. The impacts can no longer be managed just by reducing greenhouse gas emissions or by adapting our investments to take account of future climate risks. Instead, we also have to manage the reality of social and economic impacts right now, especially given that these impacts often degrade future resilience, resulting in a downward spiral of climate impacts and rising vulnerability. The unprecedented increases in global poverty in 2020 as a result of COVID-19 exemplify the multidimensional impacts that a global and complex risk can create. Even before the pandemic, it was estimated that climate change would push over 130 million more people into poverty in the next decade alone (Hallegatte et al., 2016). While we cannot perfectly predict all risks, it is essential to have large scale risk management systems in place to protect livelihoods, property, and lives in response to the accelerating impacts of environmental change.

Social protection can be a strategic tool for climate risk management and provides an important answer to the current calls for climate action and for increased resilience as we recover from COVID-19. The Paris Agreement demands rapid action to keep the average temperature from rising above 1.5 degrees, but also progress on adaptation and finance to increase resilience in the face of rising risks. However, because of the pandemic, we are now further behind on key poverty targets than just a year ago, so the window of opportunity to reduce poverty and the associated vulnerability to rising climate risks has narrowed. Social protection can be a critical policy instrument for addressing these concerns.

This paper articulates the role of social protection in addressing major socioeconomic challenges arising from climate change, especially for low- and middle-income countries, and the need to strategically link social protection and national climate change responses. It proposes a comprehensive strategic framework that joins these two agendas, recognising social protection as a key policy instrument for managing climate change, and providing a set of policy and programmatic entry-points. It is intended mainly for international and national policy makers and practitioners in climate and social protection sectors but is also relevant to those in related sectors, including humanitarian aid and disaster risk management. While the paper does not provide detailed technical guidance, it offers a starting point for a more profound and informed collaboration between social protection and climate change actors.

2. State of play: new risks and the need for social protection

2.1 A shifting risk landscape

Climate change presents a significant challenge to humanity and the planet, with negative impacts already a reality. As climate variability and average temperatures have increased, we are already experiencing more frequent and intense extreme events (e.g., heat waves, droughts, and floods), as well as witnessing more gradual changes to the environment (e.g., desertification, sea-level rise, loss of biodiversity). With global average temperatures already at 1°C above pre-industrial levels, this trend will significantly worsen if temperatures surpass 1.5°C (IPCC, 2018). Such changes will seriously impact livelihoods as we face global reductions in yields of staple crops, loss of rangeland livestock, and reductions in food availability, among others (IPCC, 2018). Unless we adapt and increase our ability to deal with increasing impacts, rising poverty may increase vulnerability to future shocks, triggering a vicious cycle.

Increasing climate risks arise not only from changes to the climate system but also from socioeconomic drivers. Climate risks refer to the possible impacts resulting from the interplay of climate-related hazards, exposure, and vulnerability. On one hand, hazards in the climate system are changing due to human-induced global warming, which has driven changes in weather patterns, the frequency and intensity of extreme weather events, and gradual changes to the physical environment. On the other hand, socio-economic development, including demographic changes and urbanisation, among others, are resulting in new patterns of exposure to a range of climate risks. These concurrent changes result in a changing risk landscape, with higher uncertainty and volatility, and often increasing risks facing the most vulnerable people (represented in Figure 1).

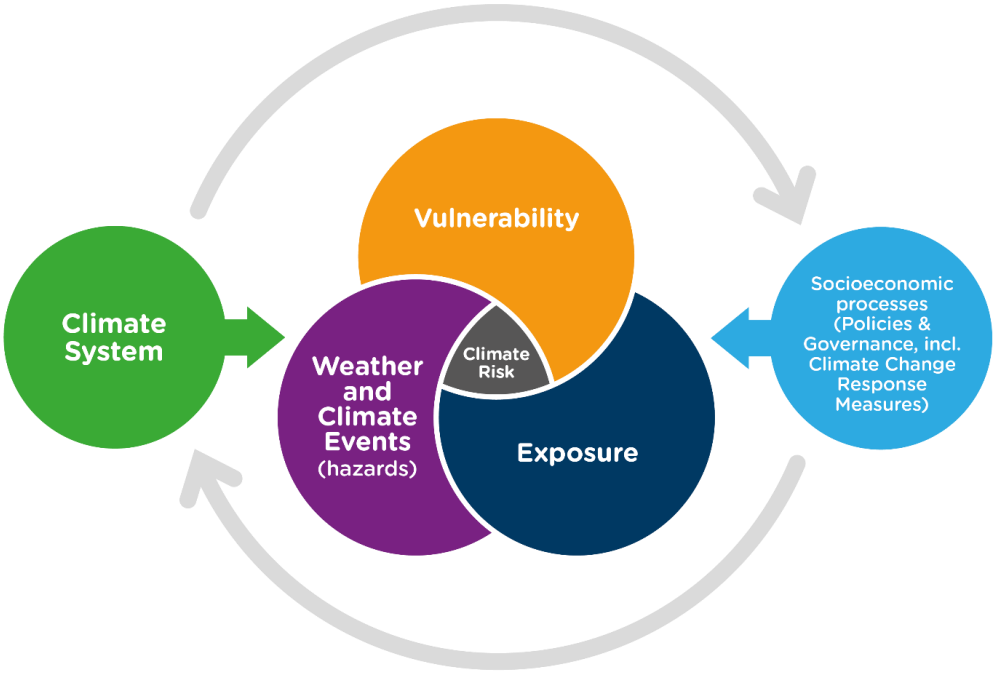
Box 1. Definitions: hazard, exposure, and vulnerability

Hazard: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. (IPCC, 2018)

Exposure: The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected [by a hazard]. (IPCC, 2018)

Vulnerability: The propensity or predisposition [of an exposed person or system] to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt. (IPCC, 2018)

Figure 1. Adapted climate risk equation from IPCC report



Source: Adapted from Oppenheimer et al. 2014.

Climate change is becoming a more important driver in this confluence of risk factors. In more and more extreme events, we now see a fingerprint of climate change, with the Australian and Californian wildfires, the $100 billion damages of hurricane Harvey in Houston, and the deadly European heatwaves among the most prominent examples. In developing countries, the limited climate data make it more difficult to pinpoint exactly how fast the climate risk is changing, but it is clear that climate change is no longer a matter of long-term gradual trends, but one of management of growing risks, including how to cope with current shocks. In the language of the UNFCCC, we have moved from mitigation (reducing greenhouse gas emissions) to adaptation (adjusting our societies to a gradually changing climate) to a

phase of also facing *loss and damage* (absorbing the climate impacts after mitigation and adaptation have not avoided the problem). Social protection is among the instruments that can make societies more resilient in the face of such growing impacts.

Box 2. Definitions: climate change response measures, mitigation and adaptation

Climate Change response measures: In this paper, we utilise the term "Climate Change response measures" to refer to both climate change adaptation and climate change mitigation measures since they consist of policies and measures whose main purpose is to deal with the consequences of climate change.

Climate Change Mitigation: "A human intervention to reduce emissions or enhance the sinks of greenhouse gases."

Climate Change Adaptation: "In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects." (IPCC, 2018)

The COVID-19 crisis has further brought to the forefront the importance of protecting people in times of shocks through large scale, established, risk management tools such as national social protection systems. Social protection is a key policy instrument to manage social risks, such as those arising from life cycle and income risks (e. g. old age, job loss, sickness) and also from covariate risks affecting whole populations (e. g. floods, pandemics) – see Box 3. To respond to the socioeconomic impacts of the COVID-19 crisis, over 200 countries and territories invested over $800 billion in more than 1,400 social protection measures in 2020 alone, significantly more than during the Global Financial Crisis of 2007-8 (Gentilini, 2021). Similarly, social protection can play a central role in managing climate risks by both addressing chronic poverty and also providing temporary support during periods of acute economic and livelihood disruption, ultimately building resilience.

While managing the social and economic impacts of COVID-19 continues to be an immediate priority, it is now crucial to consider the role of social protection in climate risk management. This is necessary for the following reasons:

- A new type of socioeconomic risk is emerging due to climate change, already having significant adverse social and economic consequences, particularly in terms of increased poverty and vulnerability, and decreased well-being across the world.
- Current disaster response, adaptation, and mitigation measures to address climate vulnerability and risk are insufficient and the existing international humanitarian institutional architecture is already overstretched.
- A fundamental shift in global and national thinking to reduce climate risk and vulnerability is needed; the adoption of new cross-sectoral approaches and policies is key.

Box 3. Definition: social protection

Social protection measures are "public actions taken in response to levels of vulnerability, risk and deprivation, which are deemed socially unacceptable within a given polity and society" (Conway et al., 2000). The International Labour Organization (ILO) defines it as "set of policies and programmes designed to reduce and prevent poverty and vulnerability throughout the life cycle" (ILO, 2017). In practice, social protection consists of social assistance (non-contributory, tax-financed benefits and services to avert poverty and deprivation); social insurance (contributory schemes financed by individuals, companies and the state in advance, such as work-related pensions and unemployment insurance); and labour market interventions.

In most countries, social protection operates as a system: at 'policy level' it is embedded in strategy, policy and legislation and is underpinned by specific governance and coordination arrangements and financing streams; at 'programme design level' it develops context-specific approaches to defining eligibility and setting benefits and services; at 'administration level', it delivers on its mandate via a set of processes/functions, often supported via a digital information system: outreach and communications, identification and registration, enrolment, payment/delivery, complaints and appeals (grievances), case management, monitoring and evaluation.

2.1.1 A new type of risk is emerging due to climate change, with significant impacts on global poverty and wellbeing

Accelerating climate change is reshaping socioeconomic risks in several ways; perpetuating and increasing poverty across the world. The poor are more vulnerable to climate-related food price hikes, are often more exposed to hazards, lose relatively more to disasters, and are disproportionately affected by ecosystem degradation as they are most reliant on natural resources for their livelihoods (Hallegatte et al., 2016). Climate-related events also push poor households into low-risk, low-return strategies that keep them poor (Hallegatte et al., 2016). Due in part to structural inequalities and discrimination based on sex, age, disability and ethnicity, the poorest, most marginalised, and deprived populations are likely to be the most affected by increased climate risks. Climate change has also already increased poverty and is expected to worsen as temperatures and exposure to multiple and compound climate-related risks continue to rise (IPCC, 2018).

The socioeconomic impacts of climate change also decrease overall wellbeing across the non-poor and contribute to making new groups vulnerable, affecting societies as a whole. Climate change leads to multiple negative impacts on education, health, nutrition, and food security affecting both poor and non-poor populations. It also contributes to making certain groups more vulnerable, i.e. more susceptible to experiencing larger impacts from climate-related risks. For instance, on the one hand, farmers are already facing reduced crop yields due to climate variability (Tadross et al.,2009); on the other, some greenhouse gas mitigation policies can create unintended socioeconomic impacts, for example by displacing low-skilled workers in high-emitting industries. Though income and livelihoods losses from these risks occur predominantly at the individual and household level, their impacts have repercussions throughout society, exacerbating social exclusion, inequality and other forms of vulnerability, and creating political and social instability.

Climate change increases risks and adds significant complexity and volatility, with impacts across multiple social and economic dimensions becoming more difficult to fully predict and track. Although there are fairly clear projections for global warming and climate change, it is far more difficult to precisely predict specific climate hazards and their impacts, particularly on social systems**.** Unlike a single direct shock or trend, climate risks are diffuse and indirect, with long-term multidimensional impacts (Schaffrin, 2014). COVID-19 represents an example of the wide-ranging impacts that large shocks can have when complex risks materialise, with repercussions far and beyond the public health sector, such as profound disruptions to daily life, livelihoods, and employment globally. COVID-19 has not only created impacts on businesses and workers across the world, but it has also increased poverty at an unprecedented rate, with up to 124 million more poor people in 2020 and numbers set to rise further in 2021 (Lakner et al, 2021). On an even larger scale, climate change is predicted to result in millions of new poor in the next decade alone and its disruptions may be even more spatially distributed and longer-term (e.g. from limitations on outdoor activities due to extreme heat, to displacement due to unviability of livelihoods or income-earning opportunities).

While the detail of future impacts may be uncertain, we know they will be significant and need to prepare for them by having adequate risk management systems in place. Some degree of damage from climate change is unavoidable (Oppenheimer et al 2014); impacts will likely undermine poverty reduction efforts and disrupt incomes and livelihoods, with expected increases in poverty. The COVID-19 crisis has provided an important reminder of the need to have systems in place to deal with complex impacts from large risks, and for those systems to be ready to protect people, their incomes and livelihoods.

2.1.2 Current disaster response, adaptation, and mitigation measures are insufficient to address climate vulnerability and risk, and the humanitarian system is overstretched

The current reliance on ex-post emergency response and humanitarian action is unsustainable with an increase in climate-related extremes. The IFRC (2019) predicts that 200 million people every year - twice as many as today - could need international humanitarian aid as a result of a combination of climate-related disasters and socioeconomic impacts of climate change. Humanitarian aid currently costs international funders $3.5-$12 billion a year but is even now insufficient for meeting the basic needs of those affected by climate-related disasters (IFRC, 2019). At the same time, the gap between requirements and funding of humanitarian Inter-Agency Appeals is growing, reaching US$11.6bn in 2019, more than three times the shortfall in 2012 (UNOCHA, 2021). As needs grow due to climate

change, with a stretched humanitarian system, urgent action is needed to address poverty and vulnerability on a more systematic and sustained basis.

Climate change adaptation efforts are not large scale nor strategic enough. Societies, economies, and ecosystems must adapt to a changing climate and its consequences, including more frequent climate extremes and changes to the physical environment (UNEP, 2021a). However, climate change adaptation measures to date have not been significant in terms of scale or scope, and so far fail to demonstrate an impact on risk at scale (Berrang-Ford et al., 2021). While efforts to mainstream climate risk management across development planning are progressing, they vary strongly from country to country (UNEP, 2021b). Many current climate change adaptation measures remain projectised or technocratic and represent small modifications to current practices rather than the required strategic integration into development plans and investments.

Some climate change mitigation policies may have negative social and economic impacts in the short- to medium- term, something that has not been significantly addressed in climate and social policies. The transition to a climate-resilient future will require compromises and bold greenhouse gas mitigation policies, some of which can adversely impact the poor and already vulnerable as evidence already indicates. For example, workers in high carbon-emitting sectors may face job losses (UNFCCC, 2016), stand-alone carbon taxation -without distributing revenue to the poor- can have impacts on lower-income deciles that spend proportionally more on carbon-intensive goods (Malerba, 2021), and land-based mitigation policies can cause food insecurity due to food price hikes (Hallegatte, 2016). A fair transition to a climate-resilient future also requires policies to protect those who might be affected by these new policies and measures. The ILO has recognised this important role in social and labour policies (ILO, 2019) however, it appears that few national plans consider this.

2.1.3 A fundamental shift in global and national policies to reduce climate risk and vulnerability is needed; new cross-sectoral approaches and policies are key

Strategic, large-scale social and economic development policies - especially those tackling poverty and vulnerability - can rapidly reduce the adverse impacts of climate change. It has been estimated that combining rapid, inclusive, and climate-informed development with targeted interventions and stronger social protection would largely reduce the short-term threat from climate change and offer a window of opportunity to address the long-term threat beyond 2030 (Hallegatte et al. 2016). The IFRC has calculated that “determined and ambitious action” on climate resilience would reduce the demand for humanitarian aid by 2030 to one-third of today’s figures (IFRC, 2019). While focusing on climate change mitigation policies is crucial to reduce the long-term impacts of climate risks, in the short-term significant gains can be made by focusing on policies that aim to reduce vulnerability (Hallegatte et al., 2016).

While social protection has been recognised as an important tool to deal with climate risks for over a decade, the ambitious strategic and programmatic joint agenda at global and national levels required to realise this potential has yet to be achieved. While international development frameworks have identified a role for social protection policies in responding to shocks in general, and climate risks in particular (see for example O’Brien et al.,2018; Davies et al. 2008; Kuriakose et al. 2013), social protection policies and programmes are still not explicitly linked to national climate change strategies or plans, and often do not strategically integrate climate risk management. When they do, the focus has been on the provision of social protection to assist selected populations in the aftermath of individual shocks, rather than consideration of its key role in contributing to adaptation and enhancing long-term socio-economic or ecological resilience at scale, including, for instance, broader responses to slow-onset events such as sea-level rise (Aleksandrova and Costella, 2021). The next section provides an overview of social protection for readers that are less familiar with it and serves as a basis for further sections where we explore the conceptual, strategic, and programmatic linkages between social protection and climate risk.

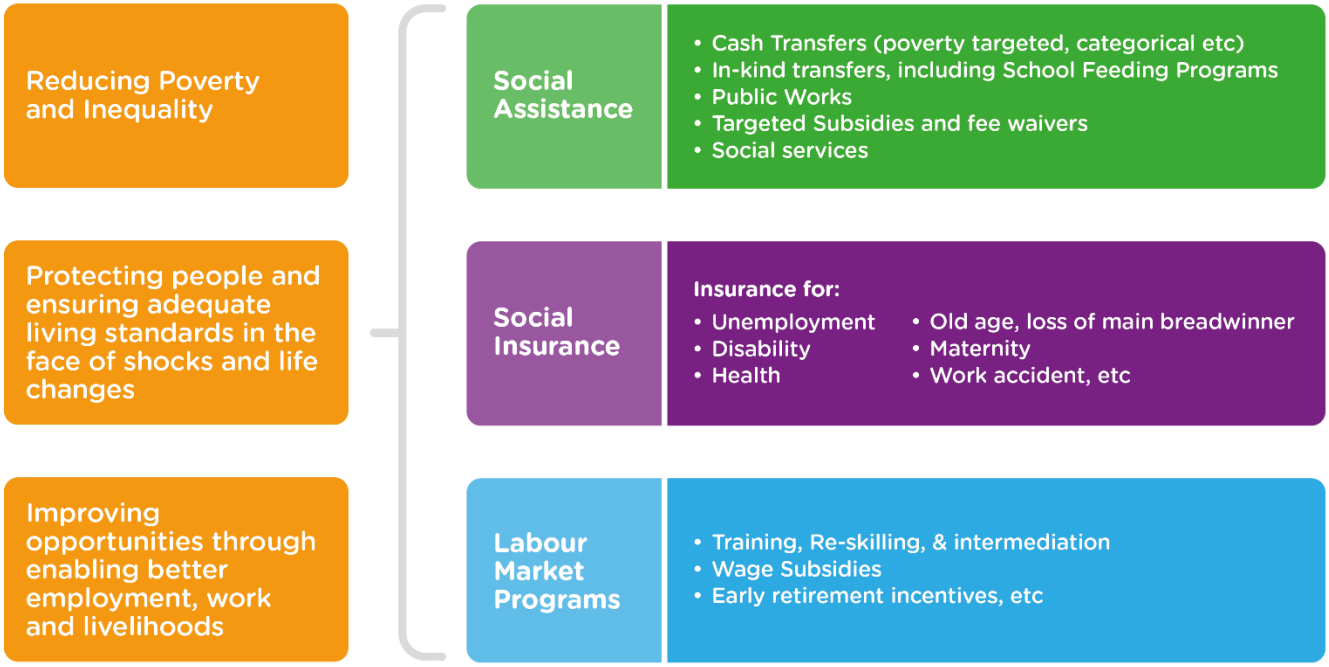
2.2 Social protection: background and relevance

Social protection has been recognised by governments and the international aid sector as a key instrument for addressing socioeconomic challenges. Overall, social protection policies and

programmes have three main objectives[1]: reducing poverty and inequality; protecting people and ensuring adequate living standards in the face of shocks and life changes; and, improving opportunities through enabling better employment, work and livelihoods.

Social protection consists of **social assistance**; **social insurance**; and **labour market interventions**, as discussed in Box 3. Figure 2. provides an overview of instruments and overlapping social protection objectives which they all contribute to. A clear example of how multiple social protection instruments contribute to all objectives comes from the social protection responses to COVID-19, where social assistance, social insurance, and labour market instruments have been used in coordination to protect people from the immediate socioeconomic impacts of the shock.

Figure 2. Social protection objectives and instruments



Source: Authors, adapted from World Bank, 2018.

Social protection is a large-scale national policy instrument to manage substantial social risks, particularly reducing poverty and deprivation; it also functions as an economic and socio-political stabiliser. Social protection has played a key role in managing emergent risks, especially at times of transition and severe economic disruption, for example, following the industrial revolution and the disruption of the first and second world wars in high-income countries (Johansson et al. 2014), and as a tool to address poverty in low- and middle-income countries (LMICs) following the economic liberalisation reforms in the 80s and 90s (see for example Barrientos and Santianez, 2009). The potential for social protection to play this role in LMICs was explicitly recognised in the social protection systems agenda that developed following the 2007/8 financial crisis. The Agenda 2030 and the Sustainable Development Goals (SDGs) highlighted social protection as a key instrument for attaining the goal of poverty reduction, explicitly identifying it as a critical tool for achieving SDG 1 (poverty eradication) and SDG 10 (equality). Developments in digital and financial infrastructure over the last decade have increased options to make large-scale provision in many LMICs viable. COVID-19 has accelerated these developments (Lowe et al, 2021) and illustrated how existing systems can be used to provide support in response to large scale risks.

Social protection coverage has grown significantly in the last two decades, with significant expansions in LMICs though it is still limited in comparison to need. Growing interest among national governments, with support from development actors, has led to a growth in social protection systems in LMICs, with coverage increasing from 20% to 45% of the global population in the last decade (McCord et al, 2021). However, around the world, only 29% of the population enjoys access to

[1] Adapted from World Bank, 2018, State of Safety Nets

comprehensive social protection benefits (ILO, 2017). Unlike many European countries which provide extensive coverage, the provision in most LMICs is more limited. In sub-Saharan Africa, only 18% percent have access to even one benefit (ILO, 2017). There are also significant gender and age gaps as coverage for women of working age, children and adolescents remain limited, particularly in Africa, Asia and the Pacific (ILO, 2017).

Globally, countries spend over US$2 trillion on social protection every year but estimates suggest that at least an additional US$500 billion is required annually to enable developing countries to make basic provision available to all (Durán-Valverde et al, 2020). Countries in the Global South account for more than US$500 billion annual expenditure (Agrawal et al., 2019), and on average they spend 1.5% of GDP on social assistance programmes alone (World Bank, 2018). Developing countries in Europe and Central Asia spend more, while those in East Asia and the Pacific, Middle East and North Africa, and South Asia spend less (World Bank, 2018). In Africa, where social protection spending in relation to GDP matches global average rates, this is significantly financed by international donors, including via grants and humanitarian funding (World Bank, 2018).

Social protection has played a significant role in the COVID-19 response, as provision has significantly expanded, albeit temporarily, enabled by a leap in digital and financial infrastructure. The magnitude of the social protection response to the COVID-19 crisis is of historical proportions and has demonstrated the potential of social protection to respond to mass covariate shocks. Although much of the expansion has been through temporary safety nets, rather than sustained systems expansion, the crisis has accelerated innovations in programme design, utilising recent digital and financial infrastructure developments in a way that has enabled scaling of social protection systems-based crisis response in ways not previously feasible (Lowe, et al, 2021).

3. Climate risks and social protection: towards a comprehensive framework

3.1 How is climate change transforming risks?

Climate change is creating new risks - which occur due to the interaction of three main factors: hazards, exposure, and vulnerability (see definitions in the Glossary). Below we identify the pathways through which these factors combine to increase risks. We focus on socioeconomic risks, which fall in the purview of social protection. Table 1 provides further details and examples of these risks and their impacts.

3.1.1 Risk drivers mainly associated with changes in the climate system

These risks are mainly driven by hazards and influenced by climate change directly. They materialise in the form of extreme weather events such as flash floods, storms, and heat waves which can lead to loss of shelter, income, assets, employment, livelihoods and lives. They also materialise as gradual changes influenced by increasing temperatures and other long-term climate changes, such as sea-level rise, loss of biodiversity, desertification, and reductions in agricultural productivity. Direct and indirect consequences include loss of livelihoods and employment sources, asset erosion, increasing incidence of health problems, temporary displacement, and permanent relocation. The growing frequency and intensity of extreme events combined with the cumulative impacts of multiple consecutive shocks and gradual changes to the physical environment will compound negative effects on social, health, and economic factors.

3.1.2 Risk drivers mainly associated with non-climate socioeconomic processes that interact with climate change

These risks are caused by processes outside the climate system which are exacerbated by climate change. They arise from policies, measures, practices, and norms in a range of sectors including agriculture, infrastructure, land use, and economic, human and social development. They drive not only negative effects, but also potential positive effects when risks are reduced. This includes risks

associated with changes to the physical environment and use of natural resources (e.g. the reduction of ecosystem services, natural resources, deforestation), demographic processes (migration, urbanisation), poverty, inequality and vulnerability (gender, disability, etc.), as well as risks from non-climate related shocks or disruptions (e.g. earthquakes, conflicts). Their main effect is to increase exposure, vulnerability, and inequality, amplifying and exacerbating the impacts of climate change.

3.1.3 Risk drivers arising from measures to respond to climate change, including mitigation and adaptation policies

These risks are similar to those just above as they are also driven by socioeconomic processes, policies, and practices, but they are specifically connected to climate change and arise from the physical, economic, financial, technological, social, and other measures adopted to help reduce greenhouse gases (mitigation measures) but also to adapt to the consequences of climate change (adaptation measures). These measures can have both direct and indirect impacts, particularly during the 'transition' period, on employment; housing; food prices, livelihoods, etc. For example, if not addressed, mitigation policies may lead to job losses, cause higher energy prices disproportionately affecting the poor, and contribute to food insecurity. Similarly, measures that favour biofuels may displace crop production, which might, in turn, exacerbate food scarcity and create price shocks in certain contexts. Climate change adaptation measures may also have undesired effects if not carefully thought through, for example where supporting irrigation to buffer the effects of rainfall variability increases competition for scarce water resources, or when the construction of a sea wall causes coastal erosion further down the coast, protecting some communities at the expense of other.

Table 1. Climate risk drivers and socio-economic impacts

Risk Source	Main Risk Drivers	Socio-economic Impacts	Impact Examples
Risks mainly associated with changes in the climate system (increase in hazards)	Extreme events (extreme/lack of rainfall, storms, extreme temperatures).	Sudden direct, indirect, and compounded consequences of shocks on social, health, and economic factors: loss of homes, incomes, assets, employment/livelihoods, lives.	Damage to houses or assets from floods or storms; Lost income from labour due to extreme temperatures; Loss of cattle or crops due to drought.
	Slow onset/gradual changes to the physical environment (sea level rise, loss of biodiversity, desertification, zoonotic diseases, etc.) Cumulative impacts of subsequent shocks	Gradual direct and indirect consequences of slow onset events on social, health, economic factors: displacement/relocation, loss of livelihoods/ employment, asset erosion, health.	Agriculture, livestock and livelihoods become unviable due to desertification, pest, etc; Migration and urbanisation due to livelihoods collapse; Increasing incidence of health issues and economic disruption due to vector-borne disease, the emergence of zoonotic diseases etc; Displacement from coastal communities or cities due to sea-level rise or repetitive shocks; Growing water scarcity in drying environments.
Risks mainly associated with broader socioeconomic processes and practices interacting with climate change	Agricultural, infrastructure, water, natural resource, land use, and other policies and practices that influence changes to the physical environment and natural resources.	Increased physical exposure translates into larger impacts of natural hazard-related disasters or shocks leading to larger socio-economic losses Gradual deterioration of livelihoods, health, incomes, etc.	Landslides caused by a combination of increased weather extremes and deforestation or informal urban settlement; Agricultural practices become unviable due to water stress caused by overexploitation of increasingly scarce water resources.
	Economic, financial, development, social, human development, and other policies, practices and norms that increase vulnerability.	Increased vulnerability translates into larger impacts of natural hazard-related disasters or shocks leading to larger socio-economic losses	Increased mortality of women in more frequent storms or flooding due to social norms or illiteracy; Youth moves from rural to urban areas due to a combination of

		Gradual deterioration of livelihoods, health, incomes, etc.	increased drought and lack of rural development or social policies.
	Non-climate related shocks or disruptions (financial crisis, earthquakes, pandemics, conflict, etc.)	Compounding risks increase vulnerability and exposure to shocks and lead to deterioration of livelihoods and impoverishment.	Communities affected by conflict and more recurrent drought are forced to migrate.
Risks mainly associated with measures to respond to climate change	Technological, financial, infrastructure, physical, economic, and other policies, and measures to reduce/stop global warming (climate change mitigation).	Direct and indirect impacts on employment; housing; food prices, relocation, livelihoods, etc.	Loss of jobs for low-skilled workers in high emission industries; Increased food prices arising from the use of grains as alternative energy sources (biofuels); Increased prices for energy and transport due to taxes or the ending of subsidy; Relocation of communities due to sea barriers or other physical adaptation.
	Physical, economic, financial, technological, social, and other measures to help systems and people adapt to climate change (climate change adaptation).		

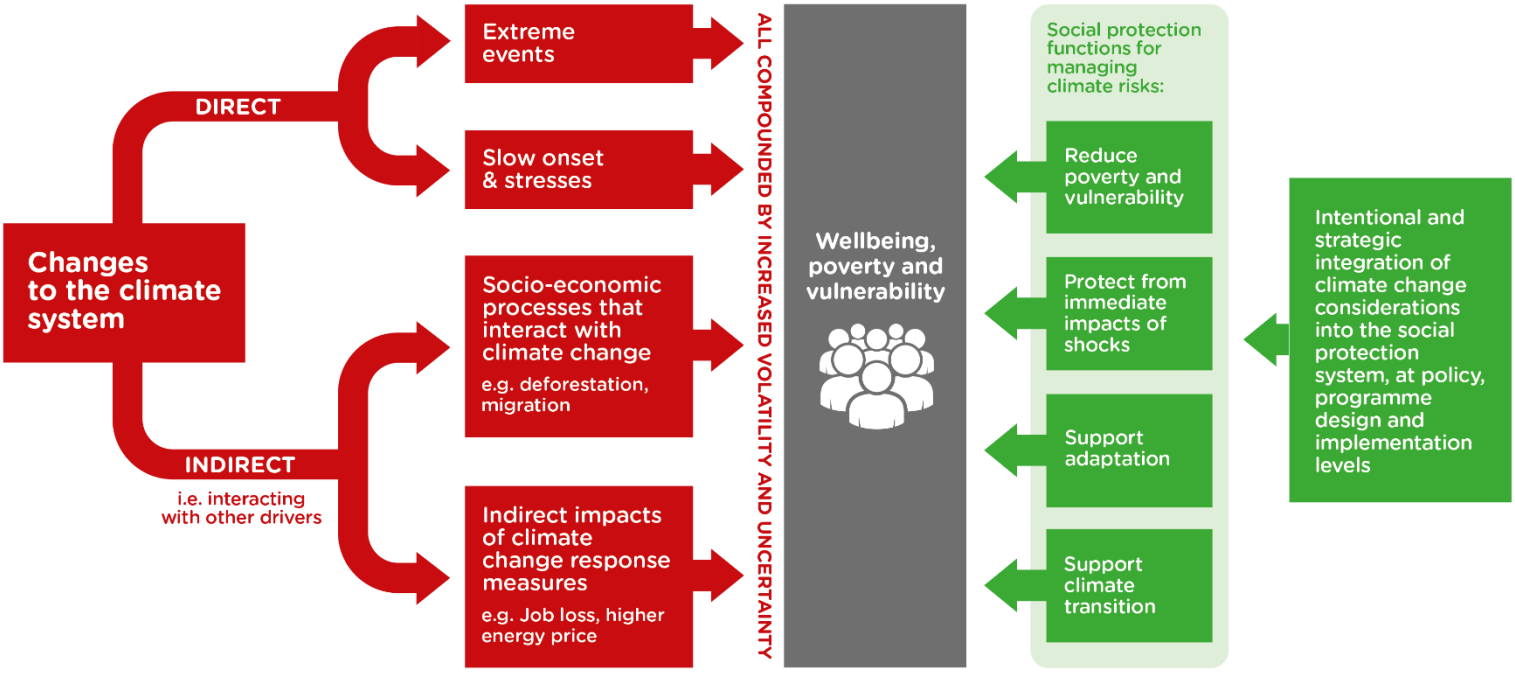
3.2 Social protection functions for managing climate risks

As illustrated above, climate change is creating new risks and exacerbating existing ones, in a process that is increasing both chronic poverty and vulnerability and which is characterised by uncertainty in terms of time and scale. **In this context social protection has four functions that support climate risk management.**

1. Reducing poverty and vulnerability, both ensuring basic wellbeing and enhancing the ability to deal with climate shocks and stressors ex-ante (before these hit).
2. Protecting people from the immediate impacts of climate shocks through shock-responsive measures at times of shocks.
3. Contributing to climate change adaptation by helping to reduce disaster risk and to enhance adaptive capacity.
4. Compensating for or incentivising measures that support a just societal transition to a climate-resilient future and a green economy.

The first two roles are core functions of social protection, while the second two are processes that social protection can contribute to, and which are key for climate risk management. For social protection to perform these functions to scale in response to climate risk management, it is necessary for social protection systems to intentionally integrate climate considerations at policy, programme design and implementation levels. Figure 3 summarises the forces that drive climate risks, their impacts and how social protection functions can offer a set of options to tackle those risks and impacts.

Figure 3. Force field of climate risk drivers, impacts, and social protection climate functions



Source: Authors.

Social protection can provide its four *climate risk management functions* through several *outcome areas*:

- **Increasing incomes and food consumption**, **reducing poverty as well as vulnerability to shocks**. Social protection provides direct income transfers, in the form of cash or in-kind transfers, and often on a regular and long-term basis. This income helps individuals and families to reduce the depth of poverty in which they live, as well as enable them to be more prepared to deal with the impacts of climate shocks.
- **Providing immediate support in the case of shocks**. Social protection helps smooth consumption and avert losses in the face of shocks, through the provision of transfers or other direct measures concerning a specific shock.
- **Promoting human development outcomes**, through increased health, education, and basic service utilisation. Social protection - often (but not necessarily) through conditional cash transfers - increases demand for these services, and in the long term contributes to a household's human capital development.
- **Contributing to the management of natural resources and the physical environment.** If linked to complementary programming or incentives, for example through Public Works Programmes (PWP), social protection can support disaster risk reduction and natural resource management objectives.
- **Contributing to improved employment, and income and livelihood opportunities.** If sufficiently generous and linked to complementary programming, social assistance programmes, combined with asset transfers or skills training, can lead to improved employment or livelihoods.
- **Providing compensation for losses caused by climate change response measures.** For instance, social protection approaches can help support workers adversely affected by transitions to cleaner energy, through re-skilling, training, and compensation payments.
- **Incentivising positive behaviours and activities** that contribute to managing climate change. When coupled with complementary measures, social protection policies and programmes can incentivise individual behaviours that help manage climate risks, for example by incentivising individuals to take care of ecosystem functions or engage in greening behaviours.
- **Contributing to strengthening governance**, by, for example, empowering vulnerable groups and enhancing citizen participation. Strengthened governance, active citizen participation, and increased

social inclusion will be key elements for a fair transition to a climate-resilient future. Rights-based and universal approaches to social protection may support progress to achieve these societal objectives.

In the next section, we review in more detail the social protection functions along these *outcome areas* identified above, briefly exploring the existing evidence, best practices, and future opportunities around each area. In section 5, we review the gaps that remain for social protection to achieve its potential in helping manage climate risks.

4. Social protection and climate: evidence, practice, and future opportunities

This section provides evidence, examples, and opportunities of how social protection can play an enhanced role in managing the risks from climate change. The section is organised around each of the outcome areas that contribute to social protection's climate risk management functions identified above. It starts from those areas with stronger evidence and more examples of practices or use, thus moving to more nascent areas. For some of the more unexplored areas, we present potential activities and initiatives that are starting to be investigated and trialled.

4.1 Social protection can reduce poverty as well as vulnerability to shocks by increasing incomes and food consumption

Social protection transfers increase incomes and have a significant impact on food consumption. Social assistance programmes have been linked to improved food security particularly in rural areas (Bastagli et al., 2019). Cash transfers have also been associated with improvements for most measures of wellbeing indicators (Bastagli et al, 2016), including improved consumption and investments (Kabeer and Waddington 2015). Whilst indicators are not always disaggregated by sex, there is evidence that social assistance may positively impact women's access to assets, financial inclusion, and livelihood opportunities (Bastagli et al., 2016).

In addition, increased incomes and food consumption, as well as reduced poverty, enhance families' ability to deal with shocks and reduce vulnerability to the impacts of shocks ex-ante. There is strong evidence that cash transfers can mitigate the negative effects of weather shocks by moderating their impacts, especially for households in the lower consumption and food security quintiles (Asfaw et al. 2017). Cash and asset transfers and public works have helped households at risk of forced displacement or distress migration following rapid-onset climate impacts (Tenzing, 2020). These benefits occur even when social protection programmes do not have a specific objective of managing climate risks, as transfers enhance families' basic risk management functions (Ulrichs et al. 2019).

4.2 Social protection can respond to the impacts of individual shocks and stressors

Social protection programmes help households cope with the immediate impacts of climate-related shocks by providing immediate support at times of crisis. Social transfers are commonly used to respond to shocks, especially in LMICs via horizontal and vertical expansion of existing social protection programmes or the introduction of new programmes that leverage existing systems to facilitate rapid and effective response (O'Brien et al. 2018). By providing direct cash or in-kind transfers to cover immediate needs or through seasonal employment guarantees, these programmes help people deal with the impacts of specific shocks (Tenzing, 2020). For instance, following the 2016 Tropical Cyclone Winston in Fiji affecting over 60% of the population, the Government with World Bank support

responded by topping up cash transfers and providing food vouchers for beneficiaries of all national social protection programmes. Utilising the existing social protection framework and internal delivery systems already in place to provide assistance meant that support was more targeted, timely and efficient (Mansur et al., 2017).

The shock-responsive function of social protection can help countries reach significant coverage during crises by expanding on existing programmes and administrative systems. Responses to socioeconomic impacts of COVID-19 illustrate this crucial function in limiting the impacts of shocks. Over 50% of the 1,500 social protection initiatives documented in response to the pandemic fully build on existing administrative systems, while a similar proportion leverage these indirectly (Gentilini et al. 2020). India, for example, has announced 14 new interventions including the provision of cash transfers to the Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGA) beneficiaries, compensation to impoverished workers who have lost work, and the creation of insurance schemes for doctors and health care specialists (Gentilini et al. 2020). This has been possible given the significant investment in social protection administrative systems – including beneficiary identification and registration, management of information, grievance and complaints, and other systems – in recent years.

Social protection can be used as a mechanism for anticipatory action, potentially on a large scale, for instance linked to forecast-based action protocols. There is growing interest in linking social protection to anticipatory action to reduce the impacts of imminent shocks (Costella et al. 2017). While yet to be applied at scale, this anticipatory approach has already been successfully trialled. In 2015, the Kenyan government successfully scaled up its Hunger Safety Net Program 2 (HSNP) in anticipation of floods predicted by the 2015–16 El Niño forecasts, providing anticipatory emergency payments to approximately 190,000 pre-registered households that were not regular beneficiaries (de la Poterie et al., 2018). Governments and international agencies in countries such as Dominican Republic, Bangladesh, and the Sahel are currently exploring early warning and forecast-based mechanisms to trigger large-scale anticipatory action through social protection systems.

Combining climate risk insurance with social protection can be part of a comprehensive risk layering approach (Väänänen et al, 2019). Layering insurance and social protection can help address different risks faced by a household, for instance as in the World Food Programme's R4 Rural Resilience Initiative which enables poor farmers to access crop insurance by participating in risk reduction activities and a cash-for-work programme. While the insurance protects farmers against extreme climate events, activities under the cash-for-work programme help them build assets and invest in natural resources management (Väänänen et al, 2019). In addition, sovereign climate risk insurance can serve as a contingency financing mechanism for governments to temporarily scale up shock-responsive social protection in anticipation or response to a shock, as part of a comprehensive disaster risk financing strategy (see for example World Bank, 2017; Longhurst et al, 2021). Social protection delivery systems can further be used to pay out the benefits of macro climate risk insurances to the effected population.

4.3 Social protection can promote human development, through improving access to health, education, and increasing basic service utilisation

Social assistance programmes can be linked to effective promotion of health preventive behaviour and access to health and education services (Evans et al., 2014; Lagarde et al., 2009). Improved health indicators include improvements in maternal and child health, healthcare access and immunisation coverage, and nutrition (See Agrawal, 2019). Social protection has also been linked to increased school enrolment and attendance, including closing gender gaps (Bastagli et al., 2019; Bastagli et al., 2016). Some social assistance programmes have also been found to reduce gender-based risks faced by women and girls, which are often exacerbated and used as coping strategies in crises, such as violence against women, child marriage and early pregnancy (Buller et al., 2018; Jones and Presler-Marshall, 2019; Peterman et al., 2017). Although most available studies do not assess how social protection may help households deal with climate risks specifically, improved incomes, education, and health likely enable households to better manage its impacts by building resilience (Agrawal et al. 2019).

4.4 Social protection can reduce disaster risks by contributing to managing natural resources and the physical environment

Social protection can contribute to reducing risks related to climate change by supporting natural resource management if linked to complementary programming and embedded in national climate change plans. This is also particularly relevant for women and girls, given their roles and responsibilities for collecting and using natural resources (fuel, water etc.) For instance, Public Works Programmes (PWP) has often been used to provide income while simultaneously promoting livelihoods through the creation of individual or public assets linked to NRM. The PWP component of the Productive Safety Net Programme (PSNP) in Ethiopia, initiated in 2005, attempts to promote natural resource management objectives by creating assets that enhance watershed management. In India, MGNREGA recently aligned its labour component in support of strategic objectives relating to water conservation and access – with significant impacts (McCord and Paul, 2019; Kaur et al, 2019). By focusing on environmental asset creation, PWPs not only contribute to individual income security and potentially productive investments on behalf of the beneficiaries (Gehrke & Hartwig, 2018), but could also have positive impacts on climate change and play a key role in the green transformation of our societies (Gyori et al, 2021). The PSNP has been estimated to contribute to an average carbon capturing of 5.7 tonnes of CO2 per hectare per year at its project sites while MGNREGA has also promoted projects for soil conservation, afforestation, and drought proofing, thereby contributing to carbon sequestration (see Gyori et al, 2021). In addition, initial evidence suggests that cash transfer programmes may have a direct effect on the beneficiaries' land use and conservation behaviours – even without an explicit environmental objective (Gyori et al, 2021). Finally, nascent efforts to combine Payment for Environmental Services (PES, reviewed below) with social assistance approaches also seek to promote NRM goals. Importantly, while promising large-scale examples such as those from Ethiopia and India highlight the potential for coupling social and environmental objectives (Norton et al, 2020), project-based interventions pervade, often with limited monitoring of environmental assets (Ludi et al, 2016), and with few programmes strategically linked to national climate change strategies.

4.5 Social protection can contribute to improved employment and income and livelihood opportunities

Social protection has the potential to improve household income and livelihood sources, which may contribute to enhanced adaptive capacity to manage risk generally.[2] Interventions that combine social protection in the form of cash transfers with complementary measures such as starter packs, microloans and insurance have helped households build their asset base, and overcome risk-based barriers to technology adoption, which in turn facilitates forward-looking planning and engagement in new income-generating activities (See Tenzing, 2020). Economic inclusion programmes, which link individuals and households into broader economic development processes, aim to help poor and vulnerable people increase assets and income through access to wage or self-employment (Archibald et al. 2020).

Social assistance programmes also have the potential to encourage investment in agricultural assets (livestock, land and farm tools) and inputs (increased fertiliser use, improved seed varieties, and increased labour demand) and can positively impact local labour patterns, trade, prices, and wages if appropriately designed and implemented to scale (Tirivayi et al., 2013). They can also bring income diversification through a shift towards non-agricultural activities (Skoufias et al., 2013); and, increase access to finance (savings, credit, loans).

[2] Adaptive capacity refers to the ability of human and physical systems to adjust to potential damage, to take advantage of opportunities, or to respond to consequences of climate change (IPCC, 2014). Adaptive capacity is key for successful climate change adaptation.

While social protection can improve livelihood opportunities it is unlikely to lead to climate change adaptation without complementary programming and sufficiently generous benefits. Evidence suggests that extremely poor households that have earning or labour potential cannot benefit immediately from resilience or asset-building programmes unless they are first provided with regular and predictable support through safety nets (Banerjee et al, 2015). There is therefore a strong basis for combining social protection interventions with climate change adaptation interventions to achieve mutual and complementary goals (Weingaertner et al. 2020; Ulrichs et al. 2019). However, attempts to integrate social protection with climate change adaptation measures remain mostly small-scale, ad hoc, and short-term, hindering outcomes in this space (See Ludi et al, 2016).

4.6 Social protection can serve to provide compensation for losses caused by climate change response measures

Social protection can be applied to compensate losses caused by measures reducing global warming and transitioning to a green economy. Social protection can minimise the negative impacts of mitigation policies and support those impacted as a result of the transition toward a low-carbon economy. For example, active labour market policies can facilitate the transition of workers from high-emission industries to low-carbon jobs through re-training, skills development, and redeployment support (ILO, 2019). Unemployment schemes and early retirement for workers of advanced age at risk of losing their jobs due to phase-outs of carbon-intensive industries can ensure workers are protected (ILO, 2019). Social assistance is also necessary to protect the poor, especially in developing country contexts where most poor work in informal sectors. For instance, China provided job training and placement services for nearly a million workers who lost jobs in state-owned forest enterprises when logging bans were enacted for newly protected lands in 1998 (ILO, 2019).

Social protection can provide social assistance to those affected by an increasing cost of consumption as a result of fossil fuel subsidy removals or carbon pricing. Removal of fossil fuel subsidies or the enactment of conservation measures that limit economic opportunities, which are often contentious, can be supplemented by cash transfers to offset the negative impacts on consumption for low-income households (Gyori et al. 2021). Different forms of redistributing carbon tax revenue can support low-income households. However, in the LMIC context, lowering income taxes (as done in high-income countries) would prove ineffective to support low-income deciles who work in the informal sector, highlighting the need for targeted cash transfers. In Peru, a simulation showed that a carbon tax, without compensation, would increase poverty, but compensating low-income households through targeted cash transfer programmes using tax revenues could decrease poverty (Malerba 2021). In some countries, especially middle- and high-income countries, circular economy measures such as shifting taxation from production or labour to resource usage or waste will create further inequalities, which social protection can help compensate for.

4.7 Social protection can incentivise positive behaviours and activities that contribute to managing climate change

Transitioning to a climate-resilient future will necessitate adjustments in individual and community-level behaviours and attitudes; social protection policies can help incentivise such behaviours, especially for households and communities that do not have the resources to do so. For instance, payments for ecosystem services (PES) offer conditional positive incentives for behavioural change or management outcomes to help manage critical ecosystems including small scale fisheries (See IIED, forthcoming). An example is Paraguay's PROEZA programme which tops up the national cash transfer programme over five years with payment conditional on the continued adoption of agroforestry practices (FAO and RCCC, 2019). Brazil's Bolsa Floresta programme offers a monthly payment to low-income households if they commit to zero deforestation and enrol their children in school (Hallegatte 2016). While PES require careful design, the available empirical evidence on the effectiveness of PES with regards to environmental impact is encouraging; an example being Mexico's

Pago por Servicios Ambientales (PSA) which programme increased management activities to protect land cover by 48% and reduced the loss of tree cover by 29% (Gyori et al. 2021).

Social protection expansion is also crucial to ensure the social acceptability of green policies. A Bergquist et al (2020) study conducted in the US found that overall, climate policy bundles that include social and economic reforms such as affordable housing, a $15 minimum wage, or a job guarantee, increase US public support for climate mitigation. Social protection therefore serves as an essential tool to increase public support necessary to drive incentives of policymakers for climate change mitigation.

4.8 Social protection holds the potential to strengthen governance by helping empower vulnerable groups and enhancing citizenship

The transition to a climate-resilient future requires addressing the unequal distribution of both climate change impacts and measures to tackle it. Populations marginalised from economic and social opportunities based on gender, age, disability, and ethnicity, face disproportionate impacts of climate change. Social protection can contribute to individual and collective empowerment, especially if a rights-based and inclusive lens is adopted. For example, the provision of social protection can support collective action to demand worker rights, social security, and equal pay for women, and increase women's control over income, access to economic resources and livelihood opportunities, and participation in decision-making (Bastagli et al., 2016; Peterman et al., 2019); as well as strengthening social networks (Song and Imai, 2019).

A human-rights-based, universal approach to social protection can promote participation and citizenship, particularly by ensuring social inclusion of vulnerable groups (Piron, 2004; UNRISD, 2016). Social protection is a key element of citizenship and the social contract (Leisering and Barrientos, 2013), which can contribute to the promotion of more equal and inclusive societies, strengthened citizen engagement, and consequently, improved governance. In the context of increasing climate change impacts, this role is likely to be increasingly important not only in terms of protecting vulnerable groups, but also in enabling a stable and fairer transition to a climate-resilient society.

5. Social protection and climate: what are the gaps?

The previous section presented evidence supporting the rationale for a greater role of social protection in managing the new risks created by climate change. In this section, we review the main gaps that need to be addressed to enable social protection to become a key instrument in managing climate change risks.

5.1 Low coverage and financing of social protection hinders the management of increasing climate risks

Under provision of social protection is significant and investments are still low compared to the need. While provision has grown significantly in LMICs over recent decades, coverage remains generally low. Global population coverage stands at 45%, yet wide disparities exist, with only 18% of the population of sub-Saharan Africa having access to any form of provision (ILO, 2017). The ILO estimates a financing shortfall of US$ 0.7 trillion per year to meet basic social protection needs, a figure which increased by 30% due to the adverse impacts of the COVID-19 pandemic on poverty and economic growth rates (Duran-Valverde et al, 2020).

The core functions of large-scale poverty and vulnerability reduction, as well as shock response, cannot be achieved adequately without long term investments in national social protection systems. In recent years, chronic impoverishment in LMICs has been addressed by the limited provision of social protection, while acute poverty induced by climate-related shocks often remains the preserve of humanitarian interventions. However, persistent poverty and vulnerability compound the impacts of shocks, and constraints in the humanitarian system, including shortfalls in financing for appeals, make such responses increasingly inadequate (UNOCHA, 2021).

Investments in building systems for social protection in the last decade have not been sufficient to enable them to manage large shocks. Having basic social protection systems in place can be a significant enabler of responsiveness, and systems development has long been identified as a key prerequisite for effective preparedness and response (McCord, 2013; Barca et al 2020; Lowe et al. 2021). Systems such as beneficiary identification and registration, payments, and M&E, are also essential for linking social protection with early warning and early action systems, and diaster risk management in general. While responses to COVID-19 illustrate the potential of existing systems, there is a need to continue investment in systems development, even in a context of uncertainty regarding Overseas Development Assistance (ODA) flows due to the pandemic-induced global economic recession.

5.2 Strategic integration of social protection and climate policies and sectors is low at country and global levels

Climate policy at global and national levels has not yet recognised the potential of social protection as a large-scale, strategic, and country-owned instrument to achieve climate change goals. While the climate agenda is now centre-stage, and the green transition is a key element of the post-COVID-19 Build Back Better agenda and future COP26, planning strategic responses to a significantly changed risk landscape has not received commensurate attention. As discussed, efforts to build climate resilience have mostly been small-scale, 'projectised', and ad hoc. Lack of ambition and effectiveness is resulting in an increasing reliance on humanitarian and disaster responses, while policy options for addressing future needs at scale via social protection remain under-emphasised. Nor has the climate change mitigation agenda yet incorporated strategic linkages with social policies as an approach for enabling a more just transition.

Similarly, social protection programmes are yet to fully integrate climate change challenges into a comprehensive national or global vision. While there are examples of social protection programmes that include climate change considerations, these initiatives have been primarily project-based, ad hoc, and short term (see for example Ludi et al, 2016). Few countries have adopted a national vision for social protection that integrates and operationalises climate concerns at scale. India is one example where social protection has been explicitly linked to a national policy and strategy on water conservation (McCord and Paul, 2019). The PSNP in Ethiopia is perhaps unique in attempting to replace repeated climate-related humanitarian interventions with a nationally owned system to build resilience.

Lack of strategic integration can be ascribed to limited coordination across sectors and between levels, from national to local levels, as well as across global bodies, donors, and other international agencies. especially under a unifying national vision. Coordination across relevant sectors is inherently difficult, and in the case of climate change and social protection, it involves areas with significantly different understandings of risk and vulnerability, with differing disciplinary and technical traditions, programming approaches and terminology, differing financing streams and limited mutual understanding and history of collaboration. Future coordination needs to come from the development of a common vision and from investments and financing that underpin that vision, creating a space for collaboration across areas and disciplines. A set of incentives and metrics that encourage coordinated investments, planning and implementation is key at all levels, including global donors and international agencies. Furthermore, it requires changed institutional arrangements and capacity for joint implementation at national and sub-national levels.

5.3 Climate risks are not yet significantly quantified and integrated into social protection programming[3]

Social protection systems seldom integrate specific climate risk and vulnerability analysis, climate risk-related indicators, and climate information, into their design, which can adversely affect policy and programme outcomes. The limited use of climate risk information has consequences for many aspects of programming, including decisions around programme targeting, design, anticipation and early action in case of shocks, and tracking outcomes and results, as well as programme effectiveness and value for money. While most social protection programmes have not traditionally identified climate risk as to the main objective, the explicit integration of climate risk analysis will be key to addressing the future large-scale challenges that climate change will entail.

A lack of climate analysis can affect decisions on who is covered by social protection benefits, including in response to shocks. Case studies in Kenya and Tanzania suggest that those most affected by climate shocks are not always those traditionally considered vulnerable under a social protection approach (McDowell et al., 2018; Weingärtner et al., 2019). This aligns with evidence that shock-responses based on existing social protection programme coverage may not adequately cover all those affected by a climate shock, because those in need may not the same group as those targeted, often based on poverty and geographical location, for ongoing social protection provision (O'Brien et al. 2018; Barca et al., 2020).Responses to COVID-19 through social protection have clearly exemplified this issue, where a complete new segment of the population – often those in fragile employment situations – have been added to the vulnerable groups most commonly targeted by social protection in LMICs such as the very poor or socially vulnerable.

The absence of climate risk analysis can result in suboptimal social protection programme design. Challenges can range from the type and size of the transfer during a particular shock, to the creation of significant externalities, such as inadvertently creating incentives for long term maladaptation. For instance, assessments from East and Southern Africa, and Latin America, show that the value of ex-ante cash transfers and subsidies is often not sufficient to provide significant protection against the impacts of severe shocks (See Tenzing, 2020). In Ethiopia, a study found that households that were part of the PSNP had an increase in off-farm income, but this income was associated with activities involving natural resource extraction such as charcoal production (Weldegebriel and Prowse, 2013). Social protection can also create incentives for people to remain in places or livelihood systems that are becoming less viable because of environmental changes. Understanding how populations experience climate risks is crucial to inform the design of social protection and complementary interventions and avoid the risk of adverse impacts.

Social protection information systems often fail to integrate climate risk information, such as linkages with early warning systems and forecast-based triggers which would enable faster shock-response. An example of this approach is the UK Cold Weather Payment which provides a social protection benefit based on a forecast of a cold wave, an example that can provide lessons for programmes in other contexts (Etoka et al, 2021). While this is potentially an important aspect of shock-responsive social protection systems, only a limited number of programmes have yet to integrate this approach at scale, one notable example being Kenya's HSNP (Daron et al. 2020). Accommodating risk information can help to "climate-proof" social protection systems by ensuring continuity of provision in times of shocks, protecting beneficiaries by continuing to deliver benefits when they are most needed.

Limited tracking of climate-specific indicators in social protection programmes results in a restricted evidence base on climate-related outcomes and impacts. The lack of evidence on climate-related objectives and outcomes is not only due to the limited uptake of explicit climate concerns in social protection programme and policy design, but also to the fact that where these issues have been incorporated, there has been little monitoring of impacts linked to specific metrics of climate risk (Tenzing, 2020, Levine et al., 2011). This lack of metrics and indicators may be contributing to the limited adoption of social protection as an instrument for climate change response.

[3] The opposite is also true but is not tackled here, not to lengthen the paper excessively – e.g. social protection solutions are not sufficiently integrated into climate change adaptation/mitigation strategies/programming.

Inadequate understanding of changing climate risks can lead to policies and programme interventions that are not cost-effective. Increasingly frequent shocks may result in the need for repeated interventions, and for the provision of repeated emergency support in response to recurrent or regular seasonal shocks. However, frequent shocks in the context of high levels of poverty and vulnerability risk making recurrent responses unaffordable, and more regular, sustained, large scale provision of social assistance more appropriate (Holmes and Costella, 2017). In such contexts, programming decisions will need to be informed by climate risk analysis, such as the frequency of potential shocks. The PSNP in Ethiopia and MGNREGA public works programme in India are examples of programmes offering social protection provision to scale, as alternatives to the provision of repeated climate shock response interventions.

5.4 Gender and intersectional inequalities linked to climate risks are not yet adequately addressed

Limited understanding of intersectional inequalities and how they relate to climate risks limit the effectiveness of social protection interventions. Climate change and climate-related shocks are experienced differently by men and women due to gendered norms, roles, and responsibilities, which affect both people's exposure to climate-related shocks as well as coping strategies. Differences in access to and ownership of assets and resources and labour, mobility challenges related to social stigma and social norms, physical limitations due to pregnancy, care and domestic responsibilities, and access to information or resources often disadvantage women compared to men (Koechlein and Kangasniemi, 2019). In Bangladesh, for example, exposure to climate and disaster risks leads single women-headed households to spend three times as much of their savings for disaster-related risk reduction activities, as male-headed households (Eskander and Steele, 2019). These challenges are amplified for people with disability and across different life stages either due to discrimination, or due to limited mobility which can exacerbate vulnerability for example by constraining their ability to evacuate during floods or result in exclusion from relief due to late arrival at distribution sites (Sightsavers 2015). Older people and infants and children are also particularly affected by climate shocks, often because of their limited physical capacities and dependency on others.

Social protection programmes are not routinely informed by context analyses that disaggregate drivers of poverty and climate change impacts by sex, age and disability. Most social protection programme design does not involve gender or inclusion-specific analysis which would identify differential experiences to inform social protection design (Holmes, 2019; Holmes and Slater, 2019). In addition, climate risks and vulnerabilities are not well understood, as previously explored. Whilst there are emerging good practices of programmes integrating gender and inclusion objectives in the context of climate change, the links between social protection, gender and climate resilience are not yet well identified or acknowledged in programme design and implementation. There is thus a need to collect additional disaggregated data in monitoring and evaluation, recognising the differential impacts of the programme by gender, age, disability and an associated need for programmes to recognise and build on the skills, resources, knowledge and agency of women and men which can be utilised to reduce climate risk and support emergency response (Lindley-Jones, 2018).

6. Scaling up ambition: recommendations and priorities

There is an urgent need to more explicitly link the social protection and climate change agendas, and the coming years offer a critical opportunity to do so. Climate change and poverty combined present a substantial new and growing challenge. Climate change is no longer an environmental concern for the long-term future that can be addressed just by reducing greenhouse gases and gradually adapting development plans. Instead, it poses an immediate threat to lives and livelihoods, especially in the poorest contexts, where climate hazards interact with high vulnerability. Poverty and inequality amplify the impacts of shocks and environmental concerns, which in turn increase poverty and vulnerability -- a vicious cycle. At the same time, climate change brings about complex new risks that will require large scale interventions to support significant sections of the global population in the coming

decades. A step change is needed in the way we manage these new risks. The COVID-19 pandemic has shown that social protection systems can play a key role in managing the socioeconomic impacts of large scale, multifaceted covariate risks. In the context of the Build Back Better agenda (United Nations, 2020) and the increasingly urgent transitions needed to meet the critical Paris Agreement targets on emissions, adaptation and climate finance, the next few years offer a critical opportunity to strategically link social protection and climate change ambitions and put in place coordinated plans to respond to the large scale risks that future climate change will entail.

Here we present five key areas where efforts and investments should be prioritised to support the strategic integration of social protection and climate change agendas. We then provide a set of global and national strategic and programmatic priorities for policy makers and practitioners to enable them to move this agenda forward (Table 2). The priority areas are recommended based on the current successes and gaps discussed above. They aim to ensure the explicit consideration of climate risks within social protection policy and programme design, and the strategic integration of social protection into national climate change strategies and policies.

6.1 Key recommendations for global and national policymakers

6.1.1 Advance a bold policy vision for social protection to address the growing risks arising from climate change

Global and national actors must prioritise a bold vision for addressing poverty and vulnerability in the context of climate change. In such a vision, which some have described as a "Marshall Plan for the Planet" (Polman, 2021), social protection is a key pillar for social and economic progress and stability. Green transformation plans in High-Income Countries (HICs) are starting to consider the critical role of sustainable job creation, poverty reduction, and addressing economic inequality to deal with the impacts of climate change. A concerted push is needed for these issues to become key to the climate change agenda in LMICs, underpinned by global and national policies, and by the momentous climate change policy process. Governments will need to translate this to national visions that are gender-responsive and inclusive, and that incorporates a range of actors including local and national organisations in the design and implementation.

Concrete, ambitious policies are needed to operationalise significant reductions in climate vulnerability in a changed risks landscape through social protection. Historically, social policies such as social protection have served as key national instruments to achieve large socioeconomic outcomes, particularly at times of changing risks. Now, a coordinated effort across global and national policy fora is needed to increase ambition and integration at the policy level on both the climate and social protection front. On the climate policy agenda, this includes making climate change adaptation policies less project-based and further mainstreamed across 'traditional' policy sectors, including social protection. The social protection component requires a change of vision, with climate change embedded across policies, systems, and programmes, as further explained below.

6.1.2 Expand core social protection provision, together with shock-responsive systems, to manage the impacts of climate change

Investing in social protection for poverty reduction is crucial to deal with the impacts of climate change. Investments need to be focused on (i) expanding coverage of regular social protection benefits in LMICs to reduce climate vulnerability; (ii) expanding the use of social protection to prepare and respond to shocks; (iii) developing social protection systems that enable expanded core and shock-responsive coverage through improvements in digital infrastructure and capacity; and iv) developing inclusive social protection systems which recognise and address gender and intersecting inequalities and proactively engage with civil society.

Managing the poverty impacts of climate change may not require different poverty and social protection policies; but it creates a need for more, sooner (Hallegate et al., 2014). Large investments in expanding basic social protection are needed today, both to ensure we use the current window of opportunity to reduce poverty and vulnerability, while also enabling us to prepare for larger shocks in the near future. Among these investments, prioritising expansion of coverage of regular social

assistance, as well as social insurance and labour interventions and building systems, is essential to build national resilience across LMICs.

Shock-responsive social protection will be essential in dealing with increasing needs, and in managing the increasing humanitarian load. Coupled with the core poverty reduction role of social protection, shock responsive social protection systems will be a powerful tool to manage the negative impacts of climate change in years to come. This will require investments in making systems ready to act, by investing in digital and non-digital infrastructure, and linking with early warning and early action systems.

Overall, building social protection systems (registries and broader information systems, delivery systems, M&E) can contribute to the systemic management of climate risks, for instance through critical contributions to strengthening administrative systems at the national and sub-national level to improve and institutionalise the provision of assistance for vulnerable groups, as well as to strengthen national disaster response systems, among others.

Finally, strengthening gender and social inclusion considerations in climate risk management through social protection is crucial. Among others, this will require ensuring that systems understand differentiated needs, risks, experiences, coping strategies, response strategies, and that planning, decision-making and implementation practices are inclusive –including supporting women as leaders, representation of local actors, and ensuring equitable access to climate information.

6.1.3 Increase financing for social protection to achieve climate change objectives

In a resource-constrained environment, investment in social protection offers a cost-effective way to achieve climate objectives. The protracted impacts of COVID-19 are likely to create a constrained fiscal environment for climate and social protection investments, but also humanitarian aid and disaster response. Efforts to reduce chronic poverty combined with large-scale, agile shock-responsiveness through existing national social protection systems represent smart and cost-effective investments (Cabot Venton, 2018). Closer alignment of social protection and humanitarian action can also present important efficiency gains, which can be supported by utilizing climate risk information and other climate considerations and layering or aligning social protection and humanitarian interventions to address different levels and types of risks. .

Closer alignment of climate and social protection financing is needed, as well flexible funding that links climate investments with positive social and economic outcomes. It is key to align social protection and climate interventions more closely by utilising the financial mechanisms established under the UNFCCC, as well as multilateral and bilateral climate and development funds (Aleksandrova and Costella, 2021). This may require a reframing of how climate funds track the contributions of social programmes to climate resilience, and a broader understanding of these pathways. While tracking climate-specific outcomes of social protection programmes is important, there is a need to embed this in a holistic understanding of risk, where efforts towards poverty reduction can also indirectly contribute to climate risk management.

Making explicit linkages between disaster risk financing instruments and shock-responsive social protection is key to ensure funding is available in a timely manner when shocks happen. In particular, disaster risk financing strategies need to make explicit consideration of social protection systems as a delivery channel and make sure the requisite public finance arrangements are in place to expedite funding when needed. Triggers for social protection action need to be aligned with triggers for funding. Finally, it is important that financing for social protection is available from a range of financial instruments to support actions at different scales, depending on the magnitude of the shock (Longhurst et al., 2021).

Expanding domestic resource mobilisation to finance extended coverage of core and shock-responsive social protection will require increasing tax revenue and expanding contributory social insurance, **as well as an exploration of innovative instruments such as carbon market revenues, debt restructuring, and green bonds** (e.g., Bolton, 2017; Durán Valverde et al., 2019). There may be opportunities to expand fiscal space, especially in MICs, based on the principles of economic and financial affordability, individual equity, and social efficiency (Garcia and Gruat, 2003). Social protection strengthening and expansion can also be financed with revenue from climate change mitigation policy measures including energy taxes, fossil fuel subsidy removal, etc. The recycling and redistribution of revenue from climate change mitigation policies into social protection has the potential to

protect the poor from the negative impacts that these policies may cause.

6.1.4 Integrate climate risk information and metrics into social protection to achieve comprehensive risk management and smarter investments

Integrating climate risk information, analysis, and metrics into social protection will become increasingly important to meet the challenges arising from climate change, as well as to ensure coherent investments and coordination. Social protection per se can contribute to managing the impacts of climate change by reducing poverty and protecting people against shocks. However, climate risk analysis and metrics are necessary to ensure, at a minimum, that programmes and interventions are not contributing to maladaptation and aggravating risk, but also so that they are linked to strategic outcomes and financing. Quantifying and understanding specific climate risks could lead to different decisions about social protection programme and system design. Understanding the differential impacts of climate shocks and climate change on population groups and individuals is needed to better inform social protection design to address climate risks. Importantly, linkages with early warning systems and forecast-based triggers would enable faster shock-response through social protection. Finally, tracking climate objectives, indicators, and outcomes of social protection according to their ability to contribute to managing climate risks will be important to understand the overall portfolio of climate-related investments but also measure results.

6.1.5 Adopt innovative and strategic coordination across sectors to deal with complex climate risks

Coordination across sectors and disciplines is key, and this will require the overhauling of existing coordination strategies, incentives and processes. Three issues are important to underpin better coordination: global and national visions; incentives and metrics; and building from existing partnerships, lessons, and evidence.

Strategic global and national visions for climate change need to integrate social protection, drive global and national alliances across these sectors and be underpinned by appropriate institutional arrangements. The creation of an umbrella vision, as described above, would be the first step in joint planning and translating concepts into action. Cross-sectoral coordination requires the strengthening of institutional mandates and capacities at both national and also sub-national levels, recognising that, in many contexts, coordination happens at the sub-national level. It also needs to be supported by global actors, such as donors and international agencies, who can incentivise this collaboration both through tehir investments as well as by promoting closer alignment within their own institutional architecture.

Coordination needs to be underpinned by indicators and metrics that create incentives to coordinate, both through financial incentives, but also through integrated policy and programme objectives. This requires the integration of social protection into strategic climate change action plans, and the redefinition of coordination between climate, social protection and humanitarian actors. Budget planning and international financing should include incentives for increasing the quality of social protection programming, climate linkages, and coordination, including at a local level in cities and rural communities. Programme objectives that are operationalised through climate-informed design in social protection, and outcomes measured against them will be important. Coordination requires time and investments and needs to go beyond programme- and project-specific timelines and this requires flexible multi-year financing that is not constrained to projects.

Joint learning across sectors involved in the integration of climate and social protection is key. Additional learning-based initially on a review of existing evidence is a starting point and should involve not only global, national, and local climate and social protection policy-makers and practitioners, but also humanitarian and international development actors (including regional development banks and other regional institutions), as well as key actors on gender and disability and aid effectiveness. Collaboration across these groups will enable learning from existing experiences to inform the repurposing of social protection to address the challenges of the century ahead.

6.2 Where to start? Global and national policy and programme priorities

The table below presents a set of potential entry points for global and national actors to begin to take forward the integration of the climate and social protection agendas. It is organised by focusing on two key levels: strategic and programmatic, zoning into issues that are specifically relevant to the climate and social protection agendas (i.e., ignoring many other important considerations - for example on equitable access). Implementation and delivery considerations are not included at this stage. These entry points are not meant to be prescriptive or exhaustive, but to serve as initial inputs to further development in these areas. It is also important to recognise that several blockers and enablers exist for these considerations to be taken forward, including institutional, technical, and financial constraints, and that these will need to be addressed for these actions to be successful.

Table 2. Key considerations and entry points for climate and social protection sectors

Building block	Key considerations and entry points for climate and social protection sectors
STRATEGIC	
Policy, Strategy, and Legislation	**National governments** • Develop a national, comprehensive vision on addressing climate change that includes cross-sectoral considerations, as well as clear goals on reducing poverty and vulnerability, and the role of social protection within that goal. Align to legislation and objectives in national gender equality, disability, and inclusion policies. • Embed social protection into climate sector plans and vice versa. This includes incorporating social protection as a tool to achieve climate objectives in national climate plans (for instance, NDCs), as well as ensuring climate policy objectives to inform the design of social protection policies. • Improve focus on climate risks within social policies (e.g. within social protection policy and strategic documents): this requires a better understanding of the socioeconomic impacts of climate risks, as well as ensuring analysis of current and future climate risks underpins social protection policy and strategic planning. **Global actors and donors** • Proactively position social protection as an instrument for large scale climate risk management. • Integrate social protection into the climate change discourse and climate change into the social protection agenda, while supporting increased donor coordination around social protection provision (aid harmonisation principles). • Support the development of national visions to address climate change that include poverty reduction as a key means to manage climate risks. • Provide policy and financial support to develop national social protection systems linked to climate plans, rather than separate and project-based programming. • Promote the integration of humanitarian and national social protection systems, with alignment as a first step.
Financing	**National governments** • Explicitly make the link: financing the expansion of social protection is a means to better address climate risks. • Identify medium-long term domestic and international financing to support the development of national social protection systems able to respond to current and future risks, reducing the need for humanitarian responses. At the same time, increase the contributory base of social protection. • Consider novel avenues for financing routine social protection and shock response via the social protection sector (see Longhurst et al, 2021). For example:

	• Aligning climate financing from international financing mechanisms with social protection policies and interventions. • Exploring how innovative domestic revenue sources (carbon taxes, etc.) can be linked to policies and benefits that support the most vulnerable. • Linking disaster risk financing tools to shock-responsive social protection. **Global actors and donors** • Support countries in devising national strategies for domestic financing, to increase the provision of core social protection, reducing poverty and vulnerability, and addressing climate risks. • Recognise social protection as a valid use of international climate finance. • Develop incentives and metrics within financing instruments that contribute to increasing the quality of social protection programming and integrating climate linkage considerations within social protection programming, enabling coordination linked to financing. • Provide the evidence and knowledge base for increasing linkages between disaster risk financing strategies and social protection, where possible and relevant. This includes ensuring that the potential for instruments such as risk transfer and insurance is utilised to protect those who might be most vulnerable to climate-related poverty and vulnerability.
Governance, Coordination and Learning	**National governments** • Enhance horizontal and vertical coordination at all levels between climate, social protection, humanitarian, and gender/inclusion actors (not just government and international actors, but also civil society, women's rights organisations, etc) linked to joint financing and targets. This may entail the creation of new coordination forums/bodies, or ensuring the inclusion of a broader diversity of actors within existing mechanisms. It will also entail explicit efforts to 'demystify' each sector for those who are new to it, building trust over time. Ideally, it would include the drafting of legal stipulations, Standard Operating Procedures, Memorandums of Understanding, manuals defining roles and responsibilities, etc. • Ensure a focus on vertical coordination across layers of government and horizontally at the local level (a lot of the 'action' on linking different agendas will need to happen at the local level, as well as ensuring that local actors have an active seat at the table for co-design and implementation of any activities). • Explore cross-country learning to share experiences in linking social protection and climate change mitigation and adaptation. **Global actors and donors** • Provide incentives, but also flexibility and medium to long-term horizons, for coordination around outcomes and objectives that are not project- and time-bound. • Invest in coordination directly, supporting government efforts to enhance joint planning and strategic thinking. This may involve capacity assessments and explicit addressing of capacity gaps. • Build the evidence base on the role of social protection in reducing climate vulnerability, so that it can be translated into metrics and 'policy hooks' for financing, etc. Key areas might include: climate risks and vulnerability, and social protection targeting; resilience-building activities, etc.
PROGRAMME DESIGN	
Climate Risk Information, Projections and Models	• Ensure climate risk information/data plays a central role in informing the design of social protection programmes, alongside standard information on poverty and other forms of vulnerability. This may involve: • Including climate and resilience objectives, metrics and KPIs into social protection programming, to reduce intersecting inequality in light of climate change *(more on this in rows below).* • Ensuring risk analysis in the design of interventions to avoid possible interventions that lead to maladaptation or inequality, as well as to enhance climate risk management and adaptation objectives of social protection programmes. • Linking triggers for shock-responsive social protection programmes to climate information and weather forecasts (e.g. as early Warning Systems) where appropriate and relevant.

	• More broadly, sharing data based on jointly agreed data needs among different climate change adaptation, social protection and disaster risk reduction institutions.

Setting Intervention Types, Objectives and Linkages	• Think long-term. Acknowledge the increasing risks brought about by climate change and identify shock extremes and frequencies, including potential pressures on social protection systems. This will require planning for extended coverage and increased needs, thinking across all possible social protection programmes (e.g. both social insurance and social assistance) - including filling any gaps in the current system (e.g. with new programmes).
	• Based on a solid evidence base (climate risk information, discussed above): a) incorporate climate and resilience considerations into social protection programme objectives and theory of change, where relevant (and vice versa, adding poverty reduction objectives to climate programme)s; b) ensure linkages and complementary programming within the sector and beyond, to enhance resilience building ex-ante. This will involve learning from and linkages with other sectors and areas of expertise, including for example Disaster Risk Reduction, Climate Change Adaptation and Anticipatory Action. A good example is the layering of climate-sensitive Behavioural Change Communications alongside a social protection intervention.
	• Innovate and test, building the evidence base:
	  • Test and assess existing social protection approaches to meet climate objectives or challenges. For instance, ensure that approaches to disaster risk reduction through PWPs are of high quality, informed by climate information and contribute to climate change objectives. Two examples include a) the construction of labour-intensive assets that boost the capacity of ecosystems to absorb the impact of rapid-onset and high-intensity climate hazards such as flooding or cyclones (e.g. planting and maintaining shelterbelts or mangrove forests); b) the creation of infrastructure that helps highly exposed households transition away from high-risk agricultural livelihoods into new activities that are less exposed and less sensitive to climate hazards
	  • Test and assess new or transformed social protection approaches that can serve to reach climate objectives (for example, payment for ecosystem services linked to social protection approaches is being extensively tested).

Setting Eligibility Criteria and Qualifying Conditions (Targeting)	• Consider targeting routine social assistance based on climate exposure or vulnerability - or complementing routine eligibility criteria with this lens (‘climate-smart targeting’). This includes targeting of routine programmes that aim to contribute to resilience outcomes related to slow and gradual changes to the environment, as well as shock responsive social protection (scale-ups). • To inform these decisions, assess the overlap between current eligibility criteria and qualifying conditions (i.e. current de facto coverage) and the characteristics of populations facing climate risks. Incorporate area-level data (e.g. climate hazard maps, agro-climatic zones and spatial planning tools for land use/landscape management/watershed approaches) and household level data (e.g. housing conditions, location, livelihood type, etc.) to identify those most vulnerable to natural hazards and climate change-related risks. Build the capacity of local networks to complement eligibility and targeting by identifying last mile beneficiaries or vulnerable groups who could be excluded, as well as providing accountability and transparency. • Ensure flexibility in targeting design and implementation processes to cater to possible expansions in response to covariate shocks. • Design social protection programmes to think of resilience at the individual level, and not just household (e.g. considering the types of constraints (and opportunities) faced by individuals in terms of time, capacity, capabilities, gender inequalities etc.). • Innovate and test, building the evidence base.

Transfer Level, Frequency and Duration	• When setting transfer/benefit level, frequency, duration, consider:
	  • Increased/changed needs due to climate exposure or vulnerability when determining the ‘adequacy’ of benefits.
	  • Scale-effects aimed at increasing resilience to future shocks.
	  • Seasonal needs and cyclical food deficits.
	  • Ensuring flexibility to cater to possible expansions in response to covariate shocks.

M&E	• Ensure climate-related objectives are incorporated in monitoring and evaluation frameworks for social protection.
Integrating Gender and Social Inclusion	• Understand differentiated climate-induced needs, risks, experiences, coping strategies, response strategies (sex-disaggregated and GESI analysis data, statistics, evidence), to feed into programming. • Ensure gender, disability and broader vulnerability inclusion at every stage of this process: For example, inclusive planning, decision-making and implementation practices – including supporting women as leaders, engaging with local actors; equitable access to climate information; strengthened institutional capacity and coordination on gender equality and social inclusion (e.g., training, sectoral coordination, partnering with GESI organisations); M&E which disaggregates by sex, age, disability but also measures changes relating to GESI outcomes – e.g., changes in gender relations, decision-making, control over resources etc.

Source: Authors, with V. Barca. Table categories based on DFID/GIZ Social Protection Approaches to COVID-19 team (2020). Content drawing on a wide range of sources including Bastagli, 2014; Beazley et al 2019; FAO and Red Cross Red Crescent Climate Centre, 2019; Kaur et al, 2019; Kuriakose et al 2013; Hallegatte et al 2016; Marzo and Mori, 2012; Solorzano and Cardenes 2019; Tenzing, 2020; TRANSFORM 2020.

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Acknowledgements and Disclaimer

This document was developed as part of SPACE - Social Protection Approaches to COVID-19: Expert advice helpline, implemented by the UK Foreign, Commonwealth & Development Office (FCDO),Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the Australian Government represented by the Department of Foreign Affairs and Trade (DFAT), and funded by the UK Government's FCDO, the German Federal Ministry for Economic Cooperation and Development (BMZ) and DFAT. SPACE is managed by DAI Europe Ltd contracted through the FCDO framework agreement EACDS Lot B service 'Strengthening resilience and response to crises', and the helpline advice is provided by independent consultants contracted by FCDO, GIZ, DFAT and other partners.

Published by FCDO, GIZ and DFAT.