JOURNAL OF INTEGRATIVE ENVIRONMENTAL SCIENCES
2023, VOL. 20, NO. 1, 2218472
https://doi.org/10.1080/1943815X.2023.2218472

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RESEARCH ARTICLE

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A framework to assess the role of social cash transfers in building adaptive capacity for climate resilience

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ABSTRACT

Climate change is increasingly affecting vulnerable groups and resulting in dire social and economic consequences, especially for those in the Global South. Managing current and emerging climate-related risks will require increasing individual's and communities' resilience, including enhancing absorptive, adaptive, and transformative capacities. Policymakers are now considering the role that social protection policies and programmes can play in building climate resilience by contributing to these capacities. However, there is a limited understanding of the extent to which social protection instruments can influence these three resilience-related capacities. Lack of assessment tools or frameworks might contribute to limited evidence of social protection's ability to increase climate resilience. In particular, there appear to be no frameworks or tools that help assess the role of social cash transfers (SCT) in building adaptive capacity. Based on a multi-staged literature review, we develop an adaptive capacity outcomes framework (ACOF) that can help assess SCT's contribution to building adaptive capacity, and, consequently, resilience. The framework is then tested using impact evaluation and assessment reports from SCT programmes in Indonesia, Zambia, Ethiopia, Bangladesh, and Tanzania. The exercise finds that SCTs alone have a limited contribution to adaptive capacity outcomes, but interventions that combine cash transfers with other components such as nutrition or livelihood training show positive impacts. We find that the ACOF can support assessments of SCT's contribution towards adaptive capacity. It can help build evidence, evaluate impacts, and through further research, can facilitate learning on SCTs' role in increasing climate resilience.

ARTICLE HISTORY
Received 28 February 2022
Accepted 22 May 2023

KEYWORDS
social protection; climate change; adaptive capacity; social cash transfers; resilience

1. Introduction

Climate change is intensifying risks to human and ecological systems, affecting lives and livelihoods, and increasing the vulnerability of populations (IPCC 2022).

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Supplemental data for this article can be accessed online at https://doi.org/10.1080/1943815X.2023.2218472.

Intensifying slow-onset and extreme events are some of the ways how climate change manifests and threatens lives, leading to the loss of assets, livelihoods, and lives (IPCC 2021). These impacts are particularly important for populations in the Global South, where countries have limited capacity to manage them and result in increased climate vulnerability, which in turn leads to more precarious lives and livelihoods (UNFCCC 2007; Anschell and Tran 2021). In this paper, vulnerability is defined as the propensity or predisposition to be adversely affected and encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (IPCC 2022). In the long term, the extent to which societies can successfully implement appropriate adaptation options will largely determine increasing or decreasing vulnerability to climate-related risks (IPCC 2018). For that reason, governments and international agencies around the world are investing in responses that seek to address and minimize the impacts of climate change and build climate resilience, such as national adaptation plans and disaster risk management approaches. Among these efforts, social protection has emerged as a promising policy tool to increase resilience to climate risks by reducing the vulnerability of individuals, communities, and social-ecological systems to climate events (Béné and Doyen 2018; Costella et al. 2022).

Climate resilience refers to "the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation" (IPCC 2018). The capacity to absorb, adapt to, and transform beyond the impacts of climate shocks all contribute to strengthening resilience (Béné et al. 2012), which means resilience strengthens by strengthening absorptive, adaptive, and transformative capacities. "Absorptive capacity" refers to the ability to employ coping strategies that ensure the same functionalities as before a climate shock (Béné et al. 2012). An example of absorptive capacity is having early warning systems that provide relevant and timely information enabling appropriate actions that reduce impacts from shocks (Castillo et al. 2017). Beyond this initial resistance, when a shock makes it necessary to undertake adjustments in order to continue functioning, the system moves beyond absorptive capacity to adaptive capacity (Béné et al. 2012). "Adaptive capacity" for climate resilience refers to a system's ability to adjust to climate variability and extremes and moderate the extent of damage by taking advantage of opportunities or coping with the consequences (IPCC 2014). For instance, enhanced access to new technology, seed varieties, agricultural practices and insurance or credits, indicates the strengthened adaptive capacity of beneficiaries (Castillo et al. 2017). Finally, "transformative capacity" is defined as the measure of capacity to self-organize and the ability of the system to change its own structures (Lorenz 2013), essentially to the extent of creating a fundamentally "new system". This could be in the form of reorganized work processes and resource sharing at the household, community, and institutional levels, such that it addresses the root causes of poverty and vulnerability (Castillo et al. 2017). These three capacities together contribute to resilience building and would require interventions at multiple levels to enable responses to different types of vulnerabilities and risks.

Social protection systems have long been used as instruments for poverty eradication and for addressing life-cycle risks. In the last two decades, social cash transfer (SCT)

programmes have been expanded across low and middle-income countries to encourage households to move out of poverty (Molyneux et al. 2016). In this paper, we use "social cash transfers" to refer to nationally supported, government-led cash transfer schemes, even when they might not be financed or designed exclusively by governments, and we exclude cash transfers that are primarily designed, implemented, and financed by international development actors or by non-governmental actors. Several choices can be made around the type of SCT programme being implemented including conditional cash transfers, public works, pensions, child, and disability grants. In general, the primary objective of such programmes centres on reducing or preventing poverty and deprivation caused by a lack of income, and, historically, there has been a relatively limited focus on the impacts of climate-related risks (Costella et al. 2022).

Nevertheless, with the emergence of the concept of adaptive social protection, it has been argued that social protection programmes can include a longer-term vision of resilience that builds absorptive, adaptive, and eventually transformative capacities among recipients to manage the impacts of climate change (Davies et al. 2008; Cornelius et al. 2018). Therefore, social protection is increasingly being considered as a policy tool that can increase climate resilience (Béné et al. 2013; Davies et al. 2013; Kuriakose et al. 2013; Béné et al. 2018; Ulrichs et al. 2019). In countries around the world, including Ethiopia, Honduras, Madagascar and Pakistan, national governments have used SCTs and public works programmes as part of their response to climate-related disasters since the early 2000s (Heltberg 2007; FAO and Red Cross Red Crescent Climate Centre 2019). However, the use of social protection interventions and policies as part of an integrated climate resilience approach remains limited (Ulrichs et al. 2019; Agrawal et al. 2020).

Despite the nascent research advocating the relevance of social protection for building climate resilience, there is a considerable knowledge and evidence gap on whether and how these instruments increase climate resilience capacities, especially adaptive and transformative capacities. Several studies state that social protection interventions such as SCTs can increase people's ability to cope with shocks (absorptive capacity) (Bowen et al. 2020). For instance, SCTs allow households to directly buffer a shock by providing direct cash when a shock happens (Premand and Stoeffler 2020). Adaptive and transformative capacities, however, are less researched. In particular, increases in transformative capacity are difficult to measure due to the breadth and unwieldiness of the concept. This might be due, in part, to the fact that transformative capacity includes addressing underlying social and political dimensions of vulnerability (Davies et al. 2008). Keeping this in mind, and in order to narrow the scope of the discussion presented in this paper, we do not focus on absorptive and transformative capacities, but rather on evidenced ways that improve "adaptive capacity" through the support provided by SCTs.

As previously discussed, a key element of resilience is adaptive capacity. Literature suggests that low adaptive capacity results in high vulnerability (Thomas et al. 2019) i.e. a lack of adaptive capacity in individuals, households, or communities will increase will result in an increase vulnerability (Sharma and Ravindranath 2019). According to Parry et al. (2007), vulnerability can be reduced by increasing adaptive capacity; and improving adaptive capacity will lead to an increase in resilience (Béné et al. 2012). Based on this, we infer that vulnerability and resilience are the two sides of the same coin and behaviours

and actions that improve adaptive capacity will reduce vulnerability and hence increase resilience.

Adapting the (2017) definition, this paper understands the adaptive capacity of individuals, households, or communities as "actions" and "behaviours" that can contribute to "outcomes" that help adjust to climate variability and extremes and moderate the extent of damage by taking advantage of opportunities or coping with the consequences. Our research focuses exclusively on adaptive capacity actions, behaviours, and outcomes that can be facilitated by SCT programmes, i.e. it aims to explore how SCTs build adaptive capacity by encouraging beneficiaries to adopt certain behaviours and/or undertake certain actions that lead to outcomes that, ultimately, strengthen climate resilience.

There is evidence that SCTs contribute to positive outcomes that could potentially lead to increased climate resilience. According to Bastagli et al. (2019), SCTs result in positive outcomes like savings, productive investments, and diversification of livelihood strategies. SCTs in Latin America have shown positive results on household nutrition and the local economy (Hanlon et al. 2010). A small number of studies that specifically consider climate risks show promising results. For instance, a conditional cash transfer intervention in rural Nicaragua aimed at enabling households to manage risks from weather shocks found that cash transfers, along with vocational training or a productive investment grant, provided full protection against drought shocks two years after the end of the intervention (Macours et al. 2012). Godfrey-Wood (2011) assesses the role of cash transfers specifically for building adaptive capacity to climate shocks in developing countries, showing that they can meet basic needs and help the poor respond to climate-related shocks by facilitating mobility, innovative investments, and livelihood transitions in the long term. Agrawal et al. (2020) review the relationship between SCTs and climate resilience in households and communities and conclude that the resilience level for households receiving the transfers is higher than for those who do not receive any support.

However, no tools, frameworks, or specific indicators seem to exist to measure SCT's contribution to adaptive capacity by reducing vulnerability and thereby building resilience. For instance, while (Agrawal et al. 2020) develop a set of indicators for measuring the contribution of cash transfers to climate resilience, they use "socioeconomic" indicators that are common in cash transfer and climate resilience research (e.g. nutrition and consumption, income, changes in education levels, access to health services, etc.) but do not explore how cash transfers impact adaptive capacity in particular. Likewise, Ulrichs et al. (2019) analyse how programmes seek to build resilience by contributing to three capacities (absorptive, anticipatory, and adaptive capacities – the 3As) but do not go further to develop a framework that is specific to adaptive capacity.

Social protection instruments, and especially SCTs, could play an important role in managing the impacts of climate change in the near future, and international development agencies and governments are increasingly interested in supporting this role (FAO and Red Cross Red Crescent Climate Centre 2019; Costella et al. 2021; Rigolini 2021). To understand the contribution social protection can make to managing climate change impacts, it is important to develop assessment tools that measure it, thereby enriching the evidence base (Costella et al. 2022). To contribute to this gap, the paper seeks to develop

and test a framework that helps assess the contribution of SCTs to climate resilience, in particular to adaptive capacity.

This paper aims to provide a basic set of parameters for assessing current and future SCT programmes' contribution to adaptive capacity, ultimately helping generate evidence on the role of social protection for climate resilience. First, we develop an Adaptive Capacity Outcome Framework (ACOF) that can serve as a diagnostic tool to assess how a social protection instrument – SCTs in this case – might enable a range of adaptive capacity outcomes, and thereby build resilience. As a proof of concept, the diagnostic tool is then used to analyse how five existing SCTs might have contributed to "adaptive capacity" based on their documented impacts. We present the evidence arising from the limited assessment of SCT programmes, as well as potential directions on the use of the framework to assess social protection's contribution to resilience.

2. Materials and methods

This paper aims to first develop a framework that can help assess how SCTs contribute to adaptive capacity and then use it to analyse country-level SCT programmes' impacts on adaptive capacity. To achieve this, we followed the steps documented in Figure 1.

The data for this research consists of two distinct sets of literature; one that supports the development of the adaptive capacity outcomes framework (ACOF), and the other one used for assessing existing outcomes of SCTs against the ACOF. For collecting both datasets, we used a multi-staged literature sampling method, first reviewing academic search engines including Google Scholar, Science Direct, Web of Science, Open Thesis and Scopus, and then identifying additional grey literature through a Google search (see Annex 1 for additional details on the data collection methods and analysis).

The literature reviewed for the development of ACOF consisted of 50 references primarily on climate risk management, climate change adaptation, and disaster risk management. Through coding and in-depth analysis, we first compiled a long list of adaptive actions (e.g. investing in drought-resistant seed varieties) and behaviours (e.g. adjusted planting behaviour) undertaken for adapting to climate-related risks (see Annex 2). From this long list, we selected those that were repeated three or more times in the literature – under the assumption that they would provide a stronger indication for actions and behaviours that build adaptive capacity – and included them in the ACOF. These frequently occurring actions and behaviours were then clustered into adaptive capacity "outcomes", arriving at nine distinct adaptive capacity outcomes clusters. This method for arriving at the outcomes was considered appropriate since most literature reviewed does not list specific adaptive capacity outcomes per se. The nine outcomes arrived at through our research are then further categorized into five vulnerability dimensions that they could potentially address, based on the GIZ multidimensional resilience index's classification.

The literature for reviewing the impacts of SCTs on adaptive capacity consisted of 15 documents that together presented impact evaluation data for SCT programmes in five countries, namely, Indonesia, Tanzania, Bangladesh, Zambia, and Ethiopia. The reasons for

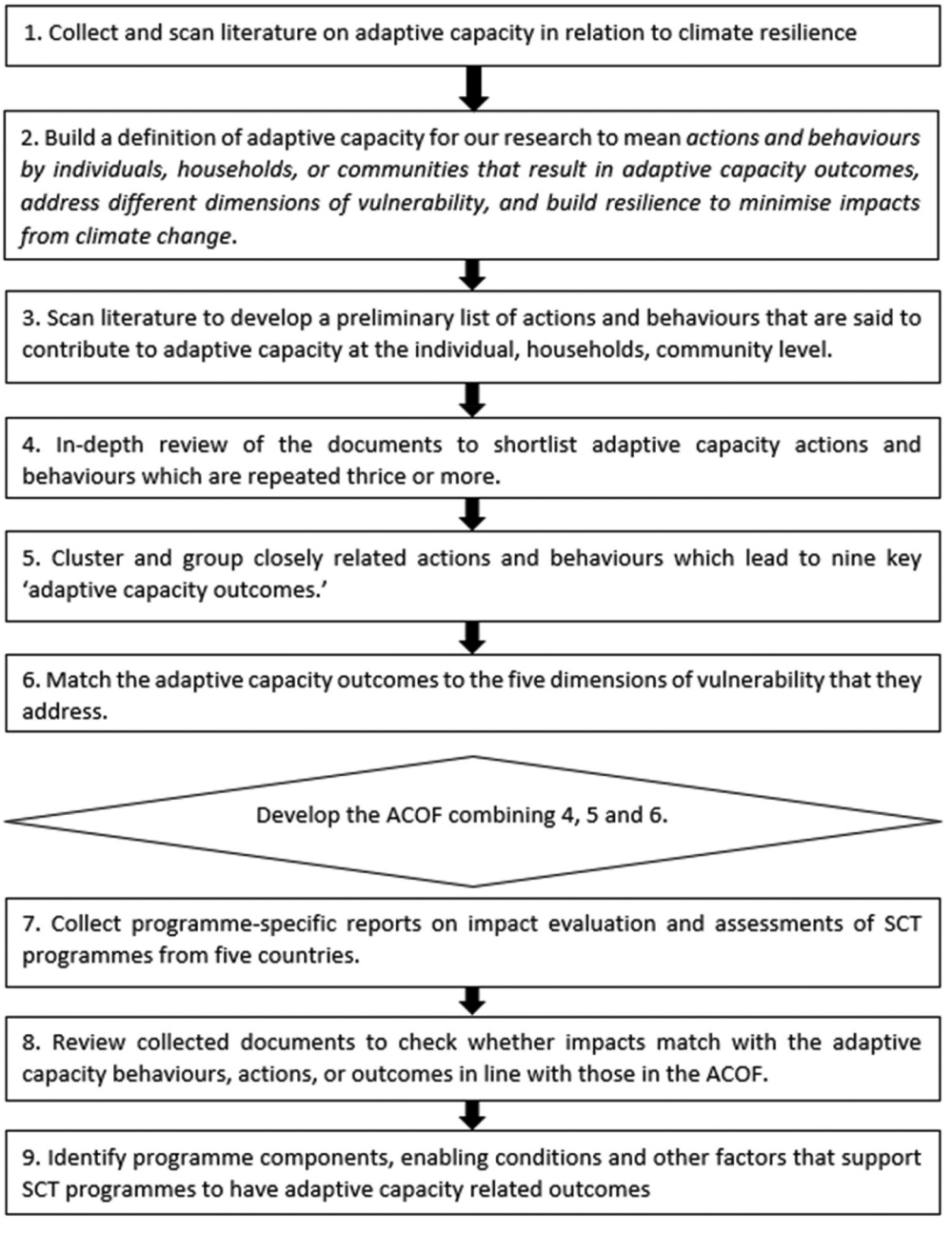

Figure 1. Flowchart showing the main steps followed in this research.

choosing these five countries are: a) the impact evaluation reports were relatively recent and published between 2010 to 2020 (with most of them, except one, published after 2013) and b) multiple evaluation reports were found for each programme, from different authors and organizations. Very few impact evaluations were found that specifically measure the impact of SCTs on climate-related outcomes. For that reason, we also collected impact evaluation reports of SCT programmes that are generic and measure

traditional impact indicators like poverty or nutrition levels. For analysing the 15 documents on impact evaluations, a coding exercise was conducted to gain insight into a) how the cash was utilized and b) whether the ways in which cash was being utilized had any impact on increasing the adaptive capacity. This was done by checking whether the actions and behaviours and the corresponding nine outcomes from the ACOF were related in any way to the SCT impacts and outcomes documented in the evaluation reports. Then, to compare the impacts across countries, a table matching the impacts with the adaptive capacity outcomes was developed. For simplicity, and since we do not quantify the outcomes in our framework, it is assumed that a higher number of adaptive capacity outcomes met by an SCT programme means a higher contribution to building resilience through enhancing adaptive capacity.

3. Results: developing and testing the adaptive capacity outcomes framework

3.1. The adaptive capacity outcomes framework

We first develop the ACOF to understand which actions and behaviours SCTs could potentially contribute to enhancing adaptive capacity and building climate resilience. SCT interventions can be designed in various ways. Some SCT programmes deliver only cash (conditional and unconditional), while others can be cash plus food or cash plus public works programmes. While the cash received by beneficiaries of these programmes can be used in different ways, some actions taken, or behaviours adopted on receipt of the payment may directly contribute to building beneficiaries' adaptive capacity. From the literature, we find the adaptive capacity actions and behaviours resulting in nine adaptive capacity outcomes: Improved access to basic services (1.1), Improved knowledge and support networks (1.2), Improved natural resource base (2.1), Improved agricultural output and/or reduced agricultural losses (2.2), Availability of credit and insurance services (3.1), Improved and/or diversified incomes and livelihoods (3.2), Improved water consumption practices, water infrastructure and better water management systems (4.1), Developed climate resilient habitats (4.2) and Improved Weather Forecasting and information services (5.1).

The actions and behaviours that contribute to adaptive capacity outcomes reinforce each other. The existing adaptive capacity of a beneficiary determines what actions and behaviours he/she could take. Actions and behaviours adopted, in return, will further determine the adaptive capacity. SCTs can encourage the spending of cash in ways that help build this adaptive capacity. Actions and behaviours identified in the literature as contributing to adaptive capacity ranged from training to help income diversification, to accessing credit and weather insurance (See supplementary material).

It is important to note that several external factors determine what adaptation actions are adopted in a particular setting, such as equitability, sustainability, legitimacy, acceptability and avoiding maladaptive outcomes (Noble et al. 2014). Moreover, these factors may influence the usage of SCTs in a way that is not directly conducive to strengthening adaptive capacity. However, given the scope of this research, how these factors play a role in influencing SCT's impact on adaptive capacity was not included in the analysis for the framework.

Adaptation behaviours and actions, and their outcomes, can address vulnerability in various ways and can contribute to different components of resilience, and existing frameworks can serve as guidance to analyse how. For instance, when it comes to climate change adaptation literature, Climate-ADAPT, the European Climate Adaptation Platform, categorizes adaptation options into grey (physical/built), green (ecological) and soft (policy/legal) measures. A similar three-category classification is developed by IPCC (2014) which considers structural/physical responses, social responses, and institutional responses as measures to build resilience. To show how the nine adaptive capacity outcomes identified in this paper help address vulnerability and build resilience, we use the categorization used in the multidimensional resilience index by GIZ (Welle et al. 2014) which suggests that adaptive capacity can be strengthened by addressing five dimensions of vulnerability (expanding after Welle et al. 2014):

(a) The *social* dimension includes focussing on health, education, food security, and social networks.
(b) The *ecological* dimension includes improving attributes like biodiversity, the state of the natural environment, and ecosystem services.
(c) The *economic* dimension includes strengthening economic activities, availability and distribution of financial assets, resources, and endowments.
(d) The *physical* dimension includes improving physical infrastructure such as housing, transport infrastructure, communication networks or health facilities.
(e) The *institutional* dimension includes effective governance and institutions, improved participation

By disaggregating into five dimensions of resilience, GIZ's index provides more nuance to the pathways through which climate resilience is built and allows us to better flesh out the linkages between the adaptive capacity actions, behaviours and outcomes in our framework, and their contributions to address the five dimensions of vulnerability and resilience-building.

For this research, the actions and behaviours that result in the nine adaptive capacity outcomes are then linked with the vulnerability dimensions they address. In other words, the actions taken, and behaviours adopted result in outcomes that strengthen adaptive capacity, reduce one or more of the five dimensions of vulnerability and eventually contribute to enhanced resilience. This is represented in Figure 2.

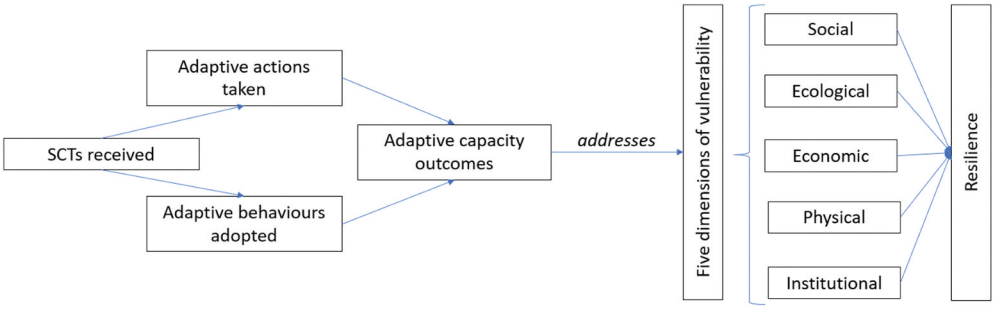

Figure 2. Graphical representation of the adaptive capacity outcomes framework (Source: Author's own).

Thus, the ACOF (Table 1) includes a) the identified adaptive capacity actions/behaviours that SCTs could contribute to, b) the adaptive capacity outcomes which refer to the results from these actions and behaviours and c) the vulnerability dimensions that these adaptive capacity outcomes address.

For instance, in the table below, adaptive capacity actions/behaviours like adjusted planting behaviour and increasing crop diversity represent actions and behaviours that lead to adaptive capacity outcomes like improved natural base (2.1) and improved agricultural output and/or reduced agricultural losses (2.2) respectively. Thereafter, these adaptive capacity outcomes (2.1 and 2.2) contribute to addressing the "ecological" dimension (2) of vulnerability and hence build ecological resilience.

Table 1. The adaptive capacity outcomes framework (ACOF).

Adaptive Capacity Actions and behaviours that SCTs can contribute to:	Adaptive Capacity Outcomes achieved:	Vulnerability dimensions addressed:
Improving public health centres, access to health plans and schemes; access to education and training centres and education schemes	(1.1) Improved access to basic services	(1) Social
Improving awareness of climate risks and implications on their environment; awareness of health risks and access to warning systems; awareness of coping mechanisms and strategies and schemes available including support from the kin, community, and the state	(1.2) Improved knowledge and support networks	
Adjusted planting, tree selection diversification, use of runoff water for watering trees, social forestry, agroforestry	(2.1) Improved natural resource base	(2) Ecological
Increasing crop diversity, seed fairs, seed safety and sovereignty; integrated crop, livestock farming systems; short-cycled crop varieties, adjusted planting timings	(2.2) Improved agricultural output and/or reduced agricultural losses	
Improving access to insurance and credit: weather-based crop insurance, flood and drought insurance, homeowner insurance for cyclones or losses from climatic events, access to micro-credits, creation of savings groups	(3.1) Availability of credit and insurance services	(3) Economic
Skill training on finance, alternative occupations, social skills, nutrition; agricultural guidance; asset transfers	(3.2) Improved and/or diversified incomes and livelihoods	
Increasing potable water sources, building and maintenance of irrigation and water retention structures; drainage and sewerage channels; pumps, screws, and lock systems; automatic irrigation and control of water leaks, pond/canal excavation, retention of rainwater and moisture conservation, desilting	(4.1) Improved water consumption practices, water infrastructure and better water management systems	(4) Physical
Flood-proofing of houses, building dikes, sheet pile walls for flood defence, light colours in houses to reduce impact of heat waves, adapting health infrastructure	(4.2) Developed climate resilient habitats	
Early warning systems, extending information and service access points and networks, use of mobiles, radios and multilanguage alerts, developing heat-health warning systems	(5.1) Improved Weather Forecasting and information services	(5) Institutional

3.2 Testing the ACOF: existing SCT's contribution to adaptive capacity

We now examine whether the impacts of the SCT programmes from five countries match with the adaptive capacity outcomes identified in the ACOF, and thereby address the vulnerability dimensions. In our research, all forms of SCTs have been considered, as long as "cash" is the main form of support. The SCTs analysed are Program Keluarga Harapan (PKH), also known as the Family Hope Program in Indonesia, the Productive Social Safety Net (PSSN) in Tanzania, the "Shombhob", old age allowance programme and the Allowance for the Widowed, Deserted and Destitute (AWDD) programme in Bangladesh, the Child Grant cash transfer program (CGP) in Zambia, and the Productive Safety Net Programme (PSNP) in Ethiopia. Most of the programmes reviewed had complimentary programmes or additional components like public works.

Table 2 lists a) the SCT programmes reviewed, b) the actions and behaviours taken by beneficiaries in the SCT programmes (as found in the impact evaluation reports), c) the

Table 2. Summary table showing actions/behaviours taken under SCT programmes that achieve the adaptive capacity outcomes from ACOF

Programmes evaluated	Vulnerability dimensions				
	(1) Social	(2) Ecological	(3) Economic	(4) Physical	(5) Institutional
Program Keluarga Harapan (PKH), Indonesia		**Action/ behaviour**: multi-cropping strategies adopted → **Adaptive Capacity outcome (2.2)**: improved agricultural output and/or reduced agricultural losses	**Action/ behaviour**: small businesses, farms and micro credit ventures set up for female entrepreneurs Improved → **Adaptive capacity outcomes (3.1, 3.2)**: improved access to credit and livelihoods diversified		
Productive Social Safety Net (PSSN), Tanzania		**Action/ behaviour**: soil and water conservation projects undertaken → **Adaptive capacity outcome (2.1)**: reduced land degradation and better managed water resources leading to improved natural resource base	**Action/ behaviour**: purchase of productive assets like chickens, goats, and other livestock; elderly landowners hired workers to cultivate their lands → **Adaptive capacity outcome (3.2)**: improved, diversified incomes and livelihoods		

(*Continued*)

Table 2. (Continued).

Programmes evaluated	Vulnerability dimensions				
	(1) Social	(2) Ecological	(3) Economic	(4) Physical	(5) Institutional
SCTs in Bangladesh		**Action/ behaviour**: increased investment in purchasing agricultural assets → **Adaptive capacity outcome (2.2): i**mproved agricultural output, reduced agricultural losses	**Action/ behaviour**: more labour allocation to non-farm activities; increasing access to credits and investments in agricultural assets → **Adaptive capacity outcomes (3.1) & (3.2)**: availability of credit and diversified incomes and livelihoods		
Child Grant cash transfer program (CGP), Zambia		**Action/ behaviour**: increasing investments in agricultural seeds, tools, and livestock → **Adaptive capacity outcome (2.2): i**mproved agricultural output, reduced agricultural losses	**Action/ behaviour**: non-farm enterprises set up (home brewery, fish selling and small trade), many owned by women; fewer loans taken → **Adaptive capacity outcome (3.2)**: diversified incomes, increased savings	**Action**: investing in improving housing quality (better flooring/ roofing and construction of toilets) → **Adaptive capacity outcome (4.2)**: climate resilient habitats developed	
Productive Safety Net Programme (PSNP), Ethiopia	**Action/ behaviour**: road construction and infrastructure development → **Adaptive capacity outcome (1.1)**: increased connectivity and access to basic services and market	**Action/ behaviour**: soil and water conservation projects undertaken, along with tree planting exercises → **Adaptive capacity outcomes (2.1) & (2.2):** improved soil quality, water availability, natural vegetation cover, leading to higher agricultural output and improved natural resource base	**Action/ behaviour**: engagement in farm and non-farm activities and purchase of productive assets with improved access to credit and agricultural extension services → **Adaptive capacity outcomes (3.1) & (3.2)**: improved access to credit, livelihoods diversified, increased incomes	**Action/ behaviour**: construction of water conservation infrastructure → **Adaptive capacity outcome (4.1)**: improved water conservation infrastructure and management practices	**Action/ behaviour**: weather information and early warning systems used to provide cash in advance → **Adaptive capacity outcome (5.1)**: improved weather forecasting and information services providing reliable information to help prepare before shocks

adaptive capacity outcomes from the ACOF that the actions and behaviours contribute to and d) the corresponding vulnerability dimensions they address.

Evidence from the impact evaluation reports and studies reviewed show that SCT interventions from the five countries do meet some of the adaptive capacity outcomes identified in the ACOF and address the five different vulnerability dimensions of GIZ's multidimensional resilience index. SCT programmes from Indonesia and Bangladesh show actions and behaviours that are relevant to three out of the nine adaptive capacity outcomes from the ACOF. This includes improved agricultural output and/or reduced agricultural losses (2.2), availability of credit and insurance services (3.1) and improved and/or diversified incomes and livelihoods (3.2). These adaptive capacity outcomes accruing from SCTs in Indonesia and Bangladesh are therefore helping reduce ecological (2) and economic (3) dimensions of vulnerability.

Likewise, Tanzania's PSSN programme includes actions and behaviours by transfer recipients corresponding to adaptive capacity outcomes like improved natural resource base (2.1) and improved/diversified incomes and livelihoods (3.2). So, the ecological (2) and economic (3) dimensions of vulnerability are addressed by the PSSN programme in Tanzania. These two vulnerability dimensions are also addressed by Zambia's CGP, which shows adaptive capacity outcome related to developed climate resilient habitats (4.2), and hence addresses the physical (4) dimension of vulnerability. Apart from (2.1), (2.2), (3.1) and (3.2), impacts from Ethiopia's PSNP show actions and behaviours relevant to three other adaptive capacity outcomes: increased access to basic services (1.1); improved water conservation infrastructure and management practices (4.1) and improved weather forecasting and information services (5.1). Thus, outcomes from Ethiopia's PSNP contribute to addressing all five dimensions of vulnerability namely social (1), ecological (2), economic (3), physical (4), and institutional (5).

Therefore, the most common contribution of SCTs programmes seems to be towards improved economic resilience by addressing the economic dimension (3) of vulnerability. All five of the SCT programmes seem to have contributed to the adaptive capacity outcome on improved and/or diversified incomes and livelihoods (3.2). These were achieved through improved results on farm yields, investments in livestock and productive assets, and increased micro-entrepreneurial activities including non-farm activities. Adaptive capacity outcome on improved availability of credit or insurance services (3.1) was also commonly observed and contributes to resilience by addressing and reducing the economic dimension of vulnerability. After the economic dimension, the ecological dimension of vulnerability seems to be the most evidenced adaptive capacity outcome, with four out of the five SCT programmes showing adaptive capacity outcome on improved agricultural output and reduced agricultural losses (2.2).

Ethiopia's PSNP and Zambia's CGP are the only programmes that showed some evidence for outcomes related to the physical dimension (4) of vulnerability. Actions and behaviours like adopting improved water management strategies and construction of water storage infrastructure were initiated under PSNP and resulted in adaptive capacity outcomes like improved water conservation infrastructure and management practices (4.1). This might be primarily because of the composite nature of the PSNP program which includes additional components like cash for work and a trigger-driven risk financing mechanism. Zambia's CGP recipients invested in improving housing quality (better flooring/roofing and construction of toilets) and

contributed to building physical resilience by achieving the adaptive capacity outcome on developed climate-resilient habitats (4.2).

The only adaptive capacity outcome from the framework that did not feature in the impacts documented from any of the programmes is improved knowledge and support networks (1.2). This outcome addresses the social dimension (1) of vulnerability and builds resilience by taking actions or adopting behaviours that improve awareness of individuals and communities about climate risks and implications on their environment, coping mechanisms and strategies and their knowledge about the support that may be available from external sources, or support from within the kin, community, or the state.

Some SCT programmes contributed differently to resilience capacities over time. The Family Hope Program in Indonesia had no impacts relevant to adaptive capacity outcomes for the first five years of its implementation until parametric changes were added to the programme design in the form of community training for business development and entrepreneurship. The government of Indonesia also introduced a community block grant program at the same time as the Family Hope Program, known as the National Community Empowerment Program – Healthy and Smart Generation (Program Nasional Pemberdayaan Masyarakat – Generasi Sehat dan Cerdas, or PNPM Generasi). The impact evaluation of this block grant program suggested that communities had invested some of the cash in building productive assets like improved water infrastructure including clean water access and irrigation systems, better roads, and health centres (World Bank 2015). Consequently, while the Indonesian CT program evaluations showed only two of the adaptive capacity outcomes, the evaluation of the community block grant shows contributions to additional adaptive capacity outcomes from the framework, potentially indicating that complementary programmes resulted in an overall increasing the adaptive capacity for Indonesian households and communities.

Additionally, due to the limited impact evaluation reports available from the "Shombhob" programme in Bangladesh, we reviewed impact evaluation reports on the productive impacts of other complimentary cash transfer schemes like old age allowance. While the standalone Sombhob SCT Pilot evaluation reports did not include impacts relevant to the adaptive capacity outcomes, complementary SCT programmes like the Old Age Allowance matched with up to three outcomes from the ACOF.

Apart from Ethiopia, none of the impact evaluation reports includes any outcomes related to access to forecasts or weather information. PSNP in Ethiopia comprises an additional component of transfers from contingency funds based on early warning systems for triggering. This also suggests that outcomes of adaptive capacity that address the institutional dimension of vulnerability, like improved weather forecasts and warning systems, might depend largely on actions taken (or not taken) by institutional actors and agencies who have the technical and financial capacity for developing such systems.

4. Discussion

Building resilience to climate change impacts for individuals, households and communities includes improving adaptive capacity, and the outcomes identified in the ACOF show the different actions and behaviours that SCTs beneficiaries can take that can lead to

strengthening adaptive capacity. While not exhaustive or conclusive, the nine most observed outcomes of adaptive capacity identified here can be regarded as a starting point to understand how SCTs can encourage different actions and behaviours that contribute to adaptive capacity. The adaptation actions and behaviours adopted can be expected to differ across contexts, and result in different levels of adaptive capacity outcomes. The nine outcomes listed in the ACOF could then be useful in the future to assess whether SCT programmes or other social protection instruments, can contribute to increasing adaptive capacity.

A pioneering paper for measuring household resilience to climate change using the Resilience Capacity Index in Ethiopia indicated that wealth, literacy level, saving behaviour, access to traditional early warning systems, vegetation cover, farm conservation, access to irrigation and access to credit are important factors of resilience building (Boka 2017). While similar adaptive actions identified in the results from Boka's (2017) study lend legitimacy to our methodology, our findings go a step forward in situating the ACOF and its nine key outcomes more firmly as a tool for measuring adaptive capacity that SCTs could contribute to.

Importantly, we find that most of the SCT programmes reviewed were not designed to meet objectives on climate resilience, and most of the actions, behaviours, and outcomes from the ACOF that were found in impact evaluation reports of the programmes did not explicitly consider their linkages to climate resilience. However, our results also show that, though SCTs tend to primarily contribute to outcomes around food consumption and basic income, there are unintended positive contributions to climate resilience capacities. This is consistent with other research that shows that social protection interventions might contribute to climate resilience outcomes even when not specifically designed with such purpose (Ulrichs et al. 2019). The contributions to adaptive capacity seen in our review seem to be a spin-off but could potentially be achieved more fully and at a larger scale with a more climate-focussed programme design.

To this end, our analysis shows that there are design features that might increase the ability of SCTs to contribute to adaptive capacity and, consequently, improve climate resilience. For instance, the Ethiopia PSNP programme, which combines additional components with SCTs and has a particular focus on improving environmental outcomes, addresses social, ecological, economic, physical and institutional dimensions of vulnerability, as it succeeds in achieving the adaptive capacity outcomes listed in ACOF. Traditional cash transfer interventions which have originally been designed for poverty alleviation could be modified to include additional components focused on increasing adaptive capacity and addressing the five dimensions of vulnerability. These modifications can include cash for work schemes focused on water and soil conservation projects, afforestation projects and other locally relevant measures that can increase community resilience. Other components like training sessions and workshops on climate awareness, sustainable agricultural practices, alternative livelihood options and risk financing mechanisms can make households less dependent on natural resources.

Moreover, social protection programmes which combine transfers with other complementary interventions in a single SCT scheme can be designed to suit the adaptation needs of different contexts. This is the case exemplified by Indonesia in our research, where complementing an individual cash transfer with a community grant programme has shown far-reaching impacts in building adaptive capacity by reducing economic and

ecological drivers of vulnerability. SCTs introduced to complement existing programmes within the same programme time frames and targeted at the same regions and beneficiaries can have a multiplier effect in developing adaptive capacity. For example, providing SCTs to a group that is already being targeted by a community project that provides training on finance, social skills, nutrition; agricultural strategies; creating savings etc. could equip beneficiaries with the financial as well as technical capacity to take actions that result in adaptive capacity outcomes.

Improving the design of the SCT programmes in line with climate change projections and vulnerability mappings to understand the intensity and impacts of disasters in advance could serve resilience-building objectives in the medium and long term, but this is often not considered. The only adaptive capacity outcome not identified in the literature on impacts of the SCTs for the five countries is on improved awareness about climate, risks and changing environment and knowledge of reliance mechanisms for coping with such risks. While it is possible that evaluations so far did not capture or measured impacts on awareness, it is also possible that awareness and information dissemination components that can build preparedness in individuals and communities are currently lacking in SCT programmes. Improving awareness and information-related components are dependent on addressing the "institutional" drivers of vulnerability, which can be implemented through improved governance, participation, and institutional coordination. For future SCT programmes seeking to integrate climate risks into their design, it might be beneficial to include capacity building and coordination measures from the national to the local level, for effective dissemination of climate information and actionable behaviours that maximize adaptive capacity outcomes.

Finally, a number of design options for making SCTs more climate-adaptive identified in the literature but that did not come up in our review remain to be explored, for instance around targeting and conditionalities (Kuriakose et al. 2013; Costella et al. 2022). For instance, it is possible that specifically targeting for climate-vulnerability proxies could enhance the ability of the programme to increase climate adaptive outcomes, but this requires additional research. In addition, relevant conditionalities could provide some incentives, for instance by being designed around actions that increase adaptive capacity (for instance, incentivizing floodproofing of houses in flood-prone areas or management of natural resources in place of receiving regular cash transfers).

Finally, it is important to note that adaptive capacity actions, behaviours, and the outcomes they result in, largely depend on decision-making processes, for instance, depending on gender or age representation among the decision-making body. They can also vary significantly based on technological choices, financial capacity, and public acceptability. In some contexts, choices might primarily be limited to community-level actions, whereas countries with more financial resources countries can opt for large-scale schemes and interventions like advanced early warning systems, floodproofing of coasts and thereby address the institutional and physical drivers of vulnerability. Developing the adaptive capacity of individuals, households, and communities, based on the outcomes identified within the ACOF, would require considerable institutional support. But it is possible to use SCTs to build resilience and reduce vulnerability by focusing on a few of the low-investment adaptive capacity actions and behaviours identified in the ACOF, like the creation of savings groups in villages.

The paper acknowledges that there is lack of data on adaptive capacity outcomes for urban settings, with predominance of adaptative capacity related actions and behaviours captured from literature focusing on rural communities, with considerable emphasis on agriculture. Nevertheless, the discussion here provides useful insights for considerations to be made when designing or adapting SCTs to contribute to adaptive capacity. Further research on SCT's role in inter-sectoral adaptation strategies is needed, especially for sectors vulnerable to climate change like water, agriculture, irrigation, energy, food, waste, nutrition and livelihoods.

5. Conclusion

Social protection instruments are now being considered as potential tools for climate resilience. There is, however, a considerable gap in evidence on whether these instruments can help build adaptive capacity for individuals and households to support such resilience. To address this gap, we developed an adaptive capacity outcome framework to assess how social protection interventions, in this case social cash transfers, can contribute to increasing climate resilience by building adaptive capacity and addressing different dimensions of vulnerability. We then tested this framework against existing evaluations and assessments of SCT programmes in five countries, in order to understand the applicability of this framework as well as to explore, to a limited extent, whether existing SCT programmes in particular are contributing to adaptive capacity.

By comparing the impact evaluations of SCT programmes across countries and match-making these impacts with the outcomes in the ACOF, we find that several of the nine outcomes are achieved by the SCT programmes. We conclude that ACOF can be used as a tool to assess SCT interventions' contribution to adaptive capacity, and it could be developed further for larger-scale assessments on SCTs, and potentially other social protection instruments. Our research also re-affirms the notion that social protection instruments can be useful for addressing climate vulnerability, managing climate risks, and building adaptive capacity. SCT programmes that combine training sessions and workshops on improving climate awareness, understanding early warnings, or exploring alternative livelihoods, can increase the adaptive capacity of households. We also note that SCT programmes with wider programmatic linkages to additional components like public works show a greater contribution to adaptive capacity for climate risks. To further enhance the impacts of SCT programmes, activities under cash for work schemes can be designed to include adaptation measures that increase climate resilience, like afforestation along coastal zones or raising/concretizing embankments in flood-prone areas. Using climate information and seasonal/sub-seasonal forecasts for systematically timing these activities during the year can help in improving adaptive capacity further, as improving infrastructure before a disaster enhances the level of protection, and cash transfers received enhance the ability to cope.

In the short to medium term, it can be expected that more governments and international donors will be investing in SCT schemes, given their popularity and relatively successful outcomes. Based on our findings, emerging areas of future research on the role of social protection and SCTs in improving adaptive capacity outcomes could include:

(1) **Developing climate-related indicators and assessment methodologies**: Impact evaluation reports of SCT programmes have studied impacts on food, income, nutrition, education and several such indicators, but there are very few impact evaluation reports that assess their outcomes on climate resilience. Climate-related indicators and assessment tools for SCTs like the ACOF can help test approaches and build evidence on programme parameters that are conducive to building adaptive capacity and how to best implement them.
(2) **Multi-staged, long term multi-year evaluations**: Capturing climate-related outcomes might necessitate a longer timeline than measuring contributions to food insecurity or income. Evaluation exercises of the SCT programmes studied here were mostly undertaken within three to five years of the program implementation. However, SCT programmes particularly designed for meeting climate resilience objectives would require multiple rounds of data collection over longer periods, as impact evaluations conducted within the first five years may not capture outcomes like improved soil or water quality, which begin to manifest only after a few years.
(3) **Evaluating spill over effects from transfers**: SCT programmes may have complementary impacts on diverse groups. However, these impacts are typically bundled, and cannot be distinguished. Research on spill over effects from cash transfers within households among different members, and within communities should be further assessed. While these can be difficult to capture, such disaggregated data is important to understand differences in the adaptive capacity of diverse groups like women, the elderly, or young children.
(4) **Differentiation between individual and institutional adaptive capacity actions**: Most evaluations assess program impacts that are directly resulting from actions and behaviours of beneficiaries, such as buying food and improving diets, investing in fertilizer and agricultural assets etc. Assessments of adaptive capacity that build on public services or institutional support are limited and needed.

Finally, the ACOF tool would benefit from additional research and testing and can be developed further for more sophisticated impact evaluations of SCT programmes in the future, including evaluations that suit the urban context. This will enable strengthening the evidence base on how SCTs and social protection instruments, in general, have implications for building climate resilience in the near and long term.

Disclosure statement

No potential conflict of interest was reported by the authors.

Data availability statement

Data available within the article or its supplementary materials

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