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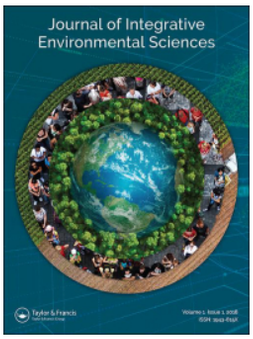

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WORLD RISK AND ADAPTATION FUTURES (FUTURE TRENDS IN EXPOSURE AND VULNERABILITY INFLUENCING CLIMATE CHANGE ADAPTATION)

Social protection in disaster risk reduction and climate change adaptation: A bibliometric and thematic review

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ABSTRACT

Social protection has emerged as a strategy to minimize climate change impacts by building the resilience of vulnerable communities. It is increasingly being used in disaster risk reduction and climate change adaptation. This study reviews the role of social protection in the scientific literature through bibliometric and thematic analysis. Web of Science database was used to retrieve the articles using selected keywords. Historical growth, citations, keywords, and country analyses were used to perform the bibliometric review. Thematic analysis was used to identify themes pertaining to social protection, disaster risk reduction, and climate change adaptation. Publications have increased over the past decade, and 142 texts from various disciplines were retrieved. The co-occurrence of keywords revealed that resilience, adaptation, and vulnerability are used in the scientific literature. The shortlisted themes investigated the role of social protection and its interventions for supporting livelihoods, assisting in food security, and disaster recovery. Social protection is emphasized as a tool for vulnerability reduction and building resilience. Literature confirms the crosscutting and multidisciplinary implications of social protection in the domains of climate change adaptation and disaster risk reduction.

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Poverty; safety nets; resilience; social assistance; vulnerability

1. Introduction

Conference of Parties (COP 26) at Glasgow, the United Kingdom, highlighted the need for social protection to reduce financial impacts on vulnerable populations (Rowling 2021; United Nations 2021). Today's global landscape with changing climate and increasing disasters sets new challenges and discourses for social protection. These changing scenarios are increasing the risks of reversing development progress (Hallegatte et al. 2016; Roy et al. 2018; Winsemius et al. 2018), putting pressure on already stretched social protection programmes (Devereux et al. 2016; Hallegatte and Rozenberg 2017; Tenzing

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2020), and influencing the future of the social protection agenda to respond to evolving climate risks. Along with its traditional role in socioeconomic development (Carter and Janzen 2018; Ulrichs et al. 2019), social protection holds promises as a tool for adaptation planning (Davies et al. 2009a; Weldegebriel and Prowse 2013; S. Mesquita and Bursztyn 2016) that extends beyond resilience to transformation (Pelling et al. 2015) and addresses social justice (Devereux et al. 2011; Kidd 2017; Midgley 2020), structural inequalities (Cecchini 2014; Plagerson and Ulriksen 2016; Osabohien et al. 2020), and political or institutional pathways through which climate vulnerability is produced (Eriksen et al. 2015; Stavropoulou et al. 2017; Sovacool 2018; Karim and Noy 2020).

Furthermore, for 71% of the world's population, social protection is not yet a reality (International Labour Organization 2017). Most developing countries are vulnerable to climate change (de Sherbinin 2014; Tucker et al. 2015), which can be associated with the lack of comprehensive social protection systems (Aleksandrova 2020). This provides an opportunity for integrating climate risk with the social protection framework. Hence, with growing interest from academia, policymakers, and development practitioners, concepts like adaptive (Davies et al. 2009bb), climate-responsive (Kuriakose et al. 2013), and shock-responsive (O'Brien et al. 2018) have been evolved in recent years to integrate social protection (SP) in climate change adaptation (CCA) and disaster risk reduction (DRR). However, it remains unclear how to frame and integrate these concepts, which are still found widely applied in silos and not scaled up to utilize their full potential (UNISDR 2012; Davies et al. 2013; Aleksandrova 2020; Tenzing 2020).

The diverse aspects of social protection in addressing current and emerging climate risks remain under-explored (Longhurst et al. 2021). Moreover, no bibliometric and thematic review has been conducted which ascertain the extent of social protection in the climate change and disaster literature. Thus, this study explores trends, themes, and future directions for synergizing social protection for climate change adaptation and disaster risk reduction.

2. Social protection in the era of climate change

Social protection agenda has grown steadily into a more complex and multidimensional framework. The concept has emerged to tackle the issues of poverty, inequality, and vulnerability (Devereux and Solórzano 2016; Aleksandrova 2020). Traditionally, social protection has focused on reducing poverty through regular and predictable support to those with inadequate or no income (United Nations Development Programme 2016; International Labour Organization 2017). But policies and programs relating to social protection still remain highly fragmented, with limited coverage of emerging climate and disaster risks (World Bank 2018; Bowen et al. 2020). Researchers emphasize exploring the nexus of social protection, disaster risk reduction, and climate change adaptation in fostering stronger linkages, breaking silos, capitalizing the systems, and bringing synergies in reducing overlapping vulnerabilities. This progression of social protection approaches from traditional framework to adjustment of climate risk components and integrate into comprehensive climate risk management practices is needed (Aleksandrova and Costella 2021).

A study by Davies et al. (2009a) attempted to link social protection, disasters, and climate change and gave the concept of adaptive social protection (ASP). The framework suggests that integrating social protection, disaster risk reduction, and climate change adaptation can help synergize the efforts to reduce vulnerabilities. Building on this, climate-responsive social protection was proposed to reduce climate impacts on livelihood assets through collaborative efforts (Kuriakose et al. 2013). More recently, a shock-responsive social protection (SRSP) framework focuses on covariate shocks (that impact a large population at the same time). The framework suggests that social protection programs can help systems cope with changes following largescale shocks (O'Brien et al. 2018). The shock-responsive varies from adaptive social protection, as the prior one attempts to reduce short-term vulnerability, while the latter focuses on transformative capacity by addressing long-term and underlying causes of vulnerability (Béné et al. 2018).

Regardless of the adaptive, climate-responsive, or shock-responsive qualifiers, it has been emphasized the importance of climate-informed planning, scalable support and coverage, appropriate finance mechanism, and strengthening institutional capacity for adapting social protection programs and systems to climate change (Tenzing 2020). These were also later echoed by other studies (Coirolo et al. 2013; Dulal and Shah 2014; S. Mesquita and Bursztyn 2016; Costella et al. 2017; Wilkinson et al. 2018; Schwan and Yu 2018; Godfrey-Wood and Flower 2018; Béné et al. 2018; Carter and Janzen 2018; Mersha and van Laerhoven 2018; Ulrichs et al. 2019).

An evolving international consensus on the role of social protection systems is echoed in the core international frameworks like the UN Sustainable Development Goals 2015–2030, Sendai Framework for Disaster Risk Reduction 2015–2030, and The New Strategic Framework 2018–2030 of the United Nations Convention to Combat Desertification (UNISDR 2015; United Nations 2015). Moreover, social protection plays a crucial role in achieving 11 out of 17 SDGs (SDG numbers 1–8, 10, 11, and 13) in combating extreme events and aiding sustainable development (Handayani et al. 2018). COP 26 has also highlighted the role of social protection programs for climate-vulnerable populations (Rowling 2021; United Nations 2021). This study, therefore, explores the current level of research and themes used for social protection in the disaster risk reduction and climate change adaptation domains.

This paper is structured by outlining theoretical perspectives and research gaps on social protection. (Section 2). The paper then describes the methodology for retrieving publications from the Web of Science database (3). Section 3.1 gives details about bibliometric and thematic analyses. The results of the analyses are presented in Section 4. Based on the analyses, the current study then suggests future research directions (Section 4.3), followed by conclusions.

3. Methods and data analysis

3.1 Data collection

The Web of Science Core Collection database was used to retrieve articles on social protection, disasters, and climate change. Keywords (i.e. social protection, social assistance, safety nets with disasters, and climate change) were chosen for retrieving

Table 1. Keywords used to retrieve documents.

Keyword Search	Search Criteria	Database*	Research Results	Date Searched
("Social protection" OR "social assistance" OR "safety nets") AND ("climate change" or "disaster*")	Title, Abstract, and Authors keywords	Web of Science Core Collection (including SCI-EXPANDED, SSCI, A&HCI, ESCI)	142	23 October 2021

*SCI-expanded: Science Citation Index – Expanded
SSCI: Social Sciences Citation Index
A&HCI: Arts and Humanities Citation Index
ESCI: Emerging Sources Citation Index

documents indexed in the database (Table 1). The keywords were searched by title, abstract, and keywords used by the author(s). No limit of the year was applied to the search criterion. The database was searched on the 23rd of October 2021. All the records with cited references were exported into a text file (delimited tabs). The database provided metadata on each article. The metadata about a single publication included title, full names of author(s) with affiliations, publication year, abstract, journal title, keywords, disciplinary categories, and the number of citations (if any). No repetition of publications was observed in the dataset.

3.2 Data analytical methods

3.2.1 Bibliometric analysis

Bibliometric analysis is used for statistically analysing published scientific literature. This study used a bibliometric-based approach to provide descriptives of social protection literature. The study has utilized four different analyses to understand research trends. Firstly, a *historical analysis* was conducted to observe the annual number of publications on social protection, disaster risk reduction, and climate change adaptation. Secondly, a *keyword analysis* was performed for the author's keywords. VOSviewer 1.6.14, an open-source software, was used to visualize the co-occurrence of keywords, with some limits to generate comprehensible figures. *Citation analysis* identified important articles based on the number of citations. Lastly, *country analysis* was conducted to identify countries publishing on social protection, disaster risk reduction, and climate change adaptation. Microsoft Excel 2019, Mendeley Referencing Desktop, and VOSviewer 1.6.14 were used for creating tables, lists, and network maps. The Analyse Results option, available on the Web of Science webpage, was used to countercheck the results.

3.2.2 Thematic analysis

Thematic analysis is a widely used method for analysing qualitative data. The analysis has been used for synthesizing literature review by various studies (Attride-Stirling 2001; Braun and Clarke 2006; Schilling 2006; Guest et al. 2012; Nowell et al. 2017; Naeem and Rana 2020; Petzold et al. 2020). This analytical method is relatively flexible and is free from any epistemological and ontological limits (Terry et al. 2017). This research follows the 6-step framework provided by Braun and Clarke (2006). The steps follow as 1) familiarization with data, 2) generating codes, 3) identifying themes, 4) reviewing themes, 5) defining themes, and 6) explaining themes. The data was sorted and organized in a reference manager (Mendeley Desktop). After that, the first step of thematic analysis included the

familiarization with all published papers. This step provides immersion in the dataset, familiarization with data, and the generation of provisional ideas (Terry et al. 2017). The library was shared between the four authors. The papers were thoroughly read to develop an understanding of social protection, climate change adaptation, and disaster risk reduction. The authors discussed key ideas and current discourses on these topics in online meetings.

In the second and third steps, the articles were initially coded according to various generic themes. Using an inductive approach (also called open coding with no predetermined codes), themes were based on specific observations drawn from the empirical studies. The objective(s) of each empirical study helped us identify key ideas, debates, and dissertations. A coding framing was applied to each word representing different objectives, concepts, ideas, phenomena, processes, patterns, methods, or topics. The recurrent words were chosen based on current social protection, DRR, and CCA discourse and context only, e.g. adaptive social protection (code 1), food insecurity (code 2), cash transfers (code 3), and rural livelihoods (code 4), and so forth. The coding process helps limit the amount of raw data to the research objective (Terry et al. 2017). However, this step is regarded as the first level of abstraction that serves as a starting point (Schilling 2006). Microsoft Excel was used to assign the codes to research studies. Every study was assigned at least one code. The procedure was repeated three times to revisit articles and any missed code/theme.

The fourth step of thematic analysis focused on reviewing all established themes and collating overlapping or strongly interrelated themes. For example, the initially coded themes of cash transfers (code 3) and cash distribution (code 7) were categorized as similar themes. The fifth step helped in merging and defining all the shortlisted themes. Here some broader themes were assisted through the formulation of subthemes. As described previously, code 3 and code 7 were merged under a new code and renamed as social protection interventions. Here themes were continuously revised till all subthemes were merged under major themes. The last step was the final refinement and defining of themes. The narrative was built on the definition and ideas discussed around identified themes shortlisted from the past steps. All the previous subthemes were also discussed under each finalized theme.

4. Results and discussion

4.1 Bibliometric analysis

This section provides a comprehensive bibliometric analysis of social protection in the context of DRR and CCA, based on publication overview, temporal, keyword, country, and citation analyses.

4.1.1 Publication overview

An overview of publications on social protection in the context of DRR and CCA has provided interesting insights (see Table 2). One hundred forty-two research publications from over 100 journals were retrieved using the selected keywords. Collectively, citations of published works were over 4000, at an average of 41 citations per paper. The authors used a total of 434 distinct keywords in their papers. A large number of

Table 2. Summary of publications in Web of science.

Fields	Summary of publications
Articles*	*142*
Sources (Journals)	*102*
Citations	*4185*
Average citations per article	*41.02*
Authors	*397*
Authors per article	*2.79*
Author's keywords	*434*
Institutions	*269*
Countries	*57*

Retrieved 23 October 2021

authors (397) and institutions (269) were involved in publishing articles on climate change, disasters, and social protection. It may be because, unlike resilience and adaptation, social protection has not been paid sufficient attention in the field of disaster risk and climate change.

4.1.2 Number of publications, disciplines, and sources

Annual growth in the number of research publication records illustrated that research on social protection was between 1 to 5 publications per year from 1992 to 2010 (see Figure 1). An increase was noticed in the number of publications from 2011, which may be attributed to the rise in climate change awareness and adaptation planning. Such growth of studies on social protection in climate change discourse may be associated with several disasters such as urban flooding, heatwaves, tropical hurricanes, droughts, etc., which are now associated with changing climatic conditions.

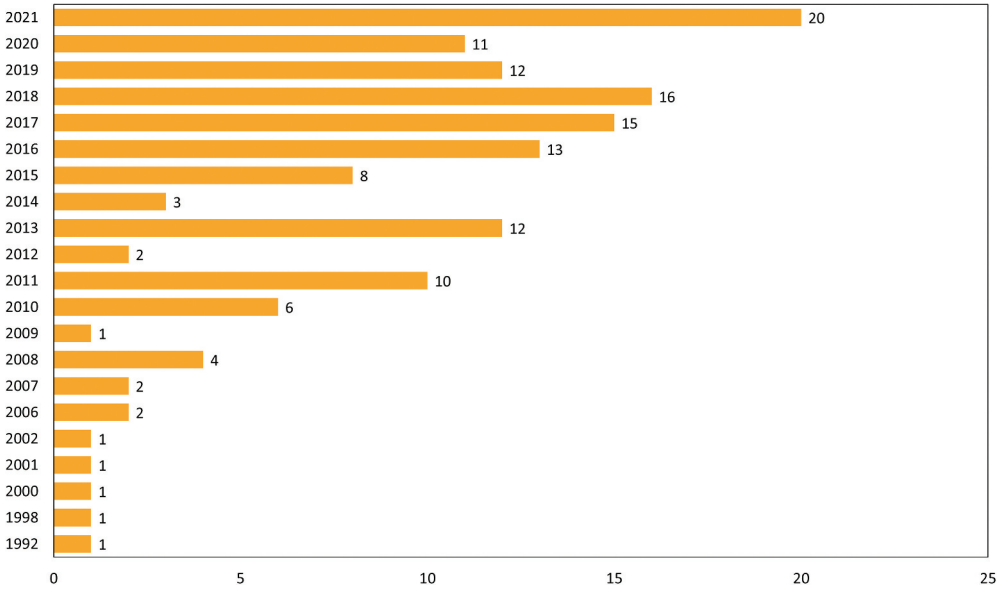

Figure 1. Annual number of publications related to social protection, disasters, and climate change (Retrieved 23 October 2021).

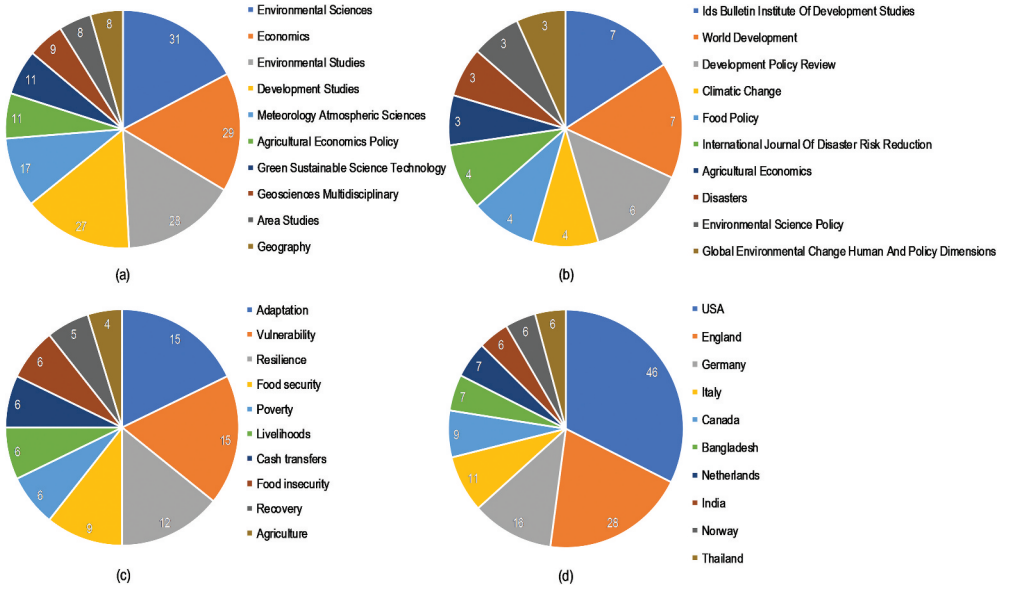

Figure 2. a) Top-ten disciplinary categories, b) Top-ten publications sources, c) Top-ten keywords used, and d) Top-ten countries.

Different disciplines have been identified in disaster-social protection and climate change-social protection. According to Web of Science disciplinary categories, a total of 49 distinct categories have used social protection in climate change and disaster literature (see Figure 2(a)). The top three disciplines were environmental sciences, environmental studies, and economics, with 31, 29, and 28 publications, respectively. These categories were followed by development studies, meteorology atmospheric sciences, and agricultural economics policy. Many disciplinary categories imply a multidisciplinary nature of the social protection concept in the disaster and climate change literature.

In terms of journals (publication sources as named by Web of Science), the majority of studies, both in disaster and climate change discourses, were published in development and environment-related journals (see Figure 2(b)). The IDS Bulletin Institute of Development Studies and World Development were the most prolific journals, with seven publications each. *Development Policy Review* published six papers on the social protection topic, while *Climatic Change, Food Policy*, and the *International Journal of Disaster Risk Reduction* had four publications each.

4.1.3 Keyword analysis

Keyword analysis discloses the thorough background of social protection literature in the context of disaster risk reduction (DRR) and climate change adaptation (CCA). It was observed that 434 unique keywords were in the retrieved scientific publications. VOSviewer was employed to determine the possible linkages and co-occurrence of the keywords specified by the authors of the shortlisted literature. Visualization maps were created for social protection to get a holistic view of the significant keywords. The map was comprised of several circles of varying diameters, each one exhibiting a keyword. The diameter of a circle depends on the number of linkages with other keywords, i.e. a higher

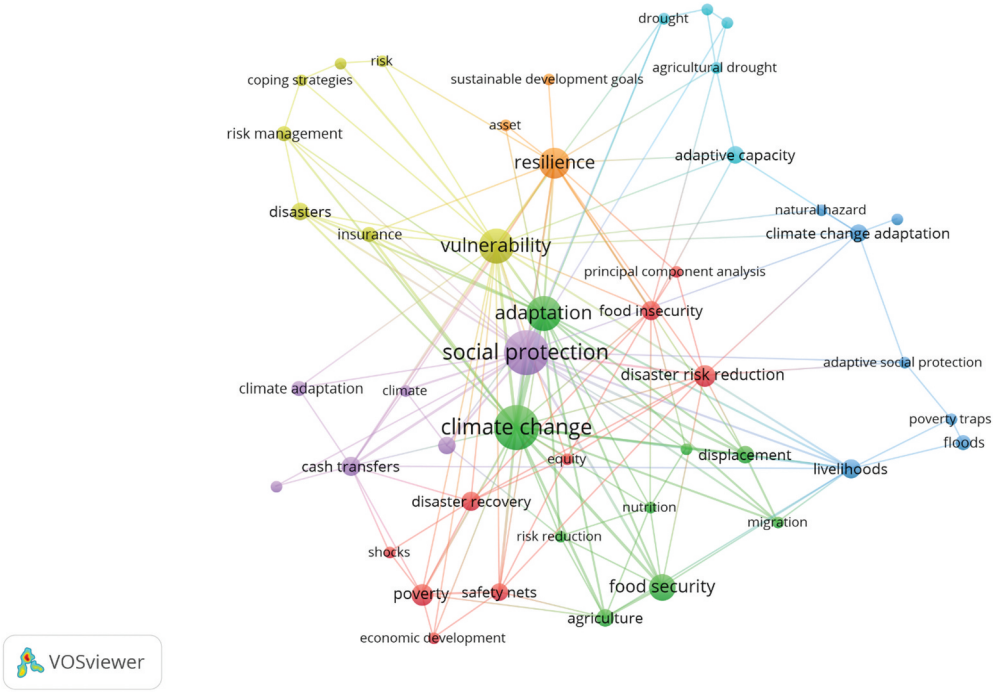

Figure 3. Network map of author's keywords (2 co-occurrence criteria with 61 Keywords, excluding country names). Retrieved 23 October 2021

number of links resulting in a larger diameter. The thickness of the line connecting any two circles reflects the frequency of co-occurrence of the keywords. Figure 3 illustrates the network map of 61 keywords that co-occurred at least twice in the considered publications of social protection. It can be observed that the keywords "Adaptation", "Vulnerability", "Climate Change", "Resilience", "Vulnerability" and "Food Security" are larger sizes which reflects the focus of these keywords in the research area. Figure 2(c) summarizes the top ten keywords used by authors in the considered literature on social protection from disaster and climate change. The analysis of Figure 3 along with Figure 2(c) reveals the importance of the keywords "Resilience", "Adaptation", "Vulnerability" and "Climate Change" as these are among the most frequently used keywords by the authors in the studies of both the parameters, i.e. "disaster and social protection" and "climate change and social protection".

4.1.4 Country analysis

The country analysis encompasses the level of research done in a particular country. It can be observed in Figure 2(d) that most research was carried out in Western countries. Among the top ten countries, The United States of America (USA) and England were the leading countries with the most research publications. In terms of social protection in the framework of DRR and CCA, the USA, England, and Germany are the leading countries with around 32.3%, 19.7%, and 11.2% of the published research, respectively. It can be observed that although mostly the Western world is leading in the considered research work, three Asian nations, Bangladesh, India, and

Table 3. The top ten most cited publications.

Sr No.	Name of the study	Number of citations (WoS)
1	Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition?	758
2	Revealing the vulnerability of people and places: A case study of Georgetown County, South Carolina	728
3	Addressing human vulnerability to climate change: Towards a "no-regrets" approach	304
4	Livelihoods, vulnerability and adaptation to climate change in Morogoro, Tanzania	269
5	Adaptation to climate change in Africa: Challenges and opportunities identified from Ethiopia	239
6	Extreme vulnerability of smallholder farmers to agricultural risks and climate change in Madagascar	195
7	A localized disaster-resilience index to assess coastal communities based on an analytic hierarchy process (AHP)	106
8	Travelling in antique lands: using past famines to develop an adaptability/resilience framework to identify food systems vulnerable to climate change	93
9	Household response to cyclone and induced surge in coastal Bangladesh: coping strategies and explanatory variables	82
10	Marginality and vulnerability – Why the homeless of Tokyo don't "count" in disaster preparations	70

Retrieved 23 October 2021

Thailand, are also making their contributions. It is interesting to note that although few of the countries at high risk and vulnerable to natural hazards and climate change have researched social protection (Bangladesh and India).

4.1.5 Citation analysis

The impact of a research study is often measured by the number of times other researchers have cited it. Therefore, citation analysis has been carried out to determine the most-cited journal articles in the context of social protection, keeping in view the parameters of disaster risk reduction and climate change adaptation, as shown in Table 3. The research work of Ruel and Alderman (2013) is the most cited publication. The study focuses on the effectiveness of unifying various social safety net platforms for early child development and nutrition programs. The study emphasizes that food security is compromised by oil price instability, climate change, and disasters that impact agricultural yields. The study highlighted the significance of social safety nets (cash or food transfers) to vulnerable households. Although the importance of social safety nets was discussed in this study, the shortcomings of such programs were also identified, and ways to enhance their outcomes were reviewed to help scale up their potential benefits for poor people, particularly young children.

The study by Cutter et al. (2000) is the second most-cited study, as shown in Table 4. This research work formulated an approach for assessing vulnerability spatially through biophysical and social indicators, hence, assessing the likely social costs of hazards in the region. The study used the provision of safety nets (insurance, additional financial resources) to absorb and ensure rapid recovery assists the population in areas of high biophysical risks.

Another highly cited study by Heltberg et al. (2009) proposed a conceptual framework by employing social risk management and asset-based approaches to address human vulnerability to climate change. The study offers a unified approach, examining links between risks, adaptation, and vulnerability, to enhance the community's potential to deal with climate risks by reducing the household's vulnerability and elevating

sustainable development prospects. The study identifies no-regrets adaptation measures that lead to net social benefits to the community exposed to all future circumstances of climate change and impacts.

4.2 Thematic analysis

4.2.1 The role of social protection in climate change adaptation and disaster risk reduction

An effective and scalable social protection system can be an essential component of disaster risk reduction (DRR) efforts in a country, potentially delivering fast and cost-efficient support to the population affected by climate shocks (Winder Rossi et al. 2017). Increasing empirical evidence support that social protection systems can effectively reduce the impacts of large-scale shocks and provide opportunities for integration with humanitarian aid and disaster risk management (DRM). O'Brien et al. (2018) have ranged these opportunities of integrations under (i) prevention and mitigation- reducing vulnerability to disasters, community-based prevention, resettlement programs, (ii) preparedness- early warning system, vulnerability assessments, contingency plans, financing, (iii) response- emergency cash/ in-kind transfer, post-disaster loss/ need assessments, and (iv) recovery- reconstruction, livelihood recovery programs (O'Brien et al. 2018).

Social protection's potential contributions to climate change adaptation (CCA) can be attributed to its different functional dimensions. Kuriakose et al. (2013) have ranged them as (i) prevention- ex-ante security against climate shocks, (ii) protection- ex-post protection against disasters and climate variability, (iii) promotion- long-term adaptation, and (iv) transformation- addressing structural causes of climate vulnerability (Kuriakose et al. 2013). Further, Malerba (2021) showed how social protection interventions under the abovementioned functions are in synergy with enhancing (i) adaptive, (ii) absorptive, and (iii) transformative capacities related to climate change adaptation. The role of social protection in disaster risk reduction and its contributions to reducing covariate shocks and increasing protective (absorptive) capacities has been addressed under the shock-responsive social protection (SRSP) framework (O'Brien et al. 2018). On the other hand, the adaptive social protection (ASP) framework underlines social protection's role in the transformational capacities for climate change adaptation (Davies et al. 2009bb).

4.2.2 Effectiveness of social protection interventions

The literature has commonly categorized social protection interventions into three types. (i) *social assistance*- non-contributory regular cash or in-kind transfers or social services for vulnerable groups (ii) *social insurance*- contributory programs to protect people from potential financial losses (iii) *labour market interventions*- a defensive mechanism for the employed population to avail opportunities and skillsets (O'Brien et al. 2018; Bowen et al. 2020). These programs can thus become part of more comprehensive, cross-sectoral strategies and national investment plans to safeguard and assist the climate-vulnerable group towards a more climate-resilient and sustainable transition.

In the event of climate change impacts, cash and food transfer schemes cushion the vulnerable population from losing livelihoods and resources (Roberts and Pelling 2018). It also plays a crucial role in emerging systems of shock-responsive social protection (SRSP) (Roelen et al. 2018). Research also suggests that cash transfer programs have

positive impacts on reducing poverty and vulnerabilities. A study showed that cash transfers help reduce education and health deprivations and increase precautionary savings (Bastagli et al. 2016). In Zambia, cash transfers enabled communities to develop coping mechanisms against weather shocks, providing a tool for autonomous adaptation in building climate resilience (Lawlor et al. 2019). Another study showed that cash transfer compensates for missing insurance markets. The study found that cash transfer motivates farmers to invest in climate-resilient agricultural practices (Prifti et al. 2019). In Bangladesh, cash and asset transfer combined with other forms of support like training results in increased social and economic abilities to cope with the impacts of climate vulnerability in rural areas (Béné et al. 2014) and the urban regions (Hossain and Rahman 2018). Similarly, cash transfers enabled communities to cope with climate change impacts in Ethiopia, Kenya, and Uganda. It helped increase the anticipatory capacity of national disaster response systems through scalability and early warning mechanisms (Ulrichs et al. 2019).

Safety nets and insurance can play a complementary role in risk management. Weather-based indexed insurance can assist smallholder farmers in overcoming risk-related barriers to adopting climate-sensitive agricultural practices (Lybbert and Carter 2015; Hansen et al. 2019). For example, Indian farmers started using drought-resilient plant seeds when paired with insurance (Hansen et al. 2019). However, if the premiums are unaffordable in the long term, smallholder farmers could be further pushed into poverty (Chantarat et al. 2017). In Mexico, a subsidized insurance model by the government was launched for smallholders. It provided a win-win solution for farmers and local governments (de Janvry et al. 2016). Moreover, the synergies of linking insurance solutions to social protection programs in reducing risk and vulnerability are emphasized in the literature (Sett et al. 2021).

Public employment schemes can also play a role in the recovery and reconstruction phase and create resilient infrastructure and public assets to reduce future shocks (Godfrey-Wood and Flower 2018). India's Mahatma Gandhi National Rural Employment Guarantee Scheme, with components of guaranteed income, rural development, efficient local governments, and the creation of new skills, is a good example of helping the communities to cope with multidimensional poverty and marginalization (Kaur et al. 2019). Research shows that the integration under an adaptive social protection system benefits the designs of vulnerability-reducing development interventions to transform short-term coping strategies into long-term strategies (Davies et al. 2013).

4.2.3 Sustainable livelihoods and food insecurity

Social protection programs have contributed to reducing poverty, enhancing food security, and protecting livelihoods. In Pakistan, social protection programs, e.g. flood relief cash programs, pension of government employees, and government utility stores for groceries, positively impacted poverty and vulnerability (Azeem et al. 2019). In Kenya, it was observed that social protection programs reduced vulnerability by promoting agriculture and economic growth (Omiti and Nyanamba 2007). In terms of food security, cash transfer projects reached more than 500,000 beneficiaries (mostly women) and increased resilience to food insecurity (Rutkowski and Bousquet 2019). Social protection programs can also affect health outcomes (based on SDGs), as evidenced in urban and rural areas of South Africa. The study found that these social protection measures positively affected

adolescent health outcomes and helped achieve sustainable development (Cluver et al. 2016). Overall, social protection measures help reduce poverty, make people resilient to food insecurity, strengthen their livelihood assets and thus help progress towards sustainable development.

4.2.4 Social protection as a tool for vulnerability reduction and building resilience

Social protection programs are considered the first line of defence for the communities vulnerable to natural hazards and climate change impacts. Siddiqi (2011) showed that social protection interventions, e.g. cash transfers, microloans, starter packs, etc., reduced the vulnerability of rural households by providing better income sources, climate resilience crops, and strengthening their livelihood assets in Africa and South America (Siddiqi 2011). In Uganda, Social Action Fund has supported the most vulnerable household for over 15 years, increasing household income and expanding economic opportunities. This has built long-term resilience against shocks (Rutkowski and Bousquet 2019). In rural areas of Pakistan, post-flood cash programs restore livelihood, replace damages, ease the mental burden, and raise aspirations for the future among farmers, thus reducing their vulnerability (Kosec and Mo 2017). Similarly, transfer schemes for drought-affected rural households in sub-Saharan Africa (by high nutrition availability) helped connect them with local markets (Dietrich and Schmerzeck 2019). This evidence suggests that social protection measures are highly effective in building people's capacities in rural and urban areas, thus reducing vulnerability to climate change impacts.

4.2.5 Disaster recovery

Social protection is advocated for faster disaster recovery. In the context of disasters, social protection programs, e.g. cash transfer, food transfer, public works, etc., are crucial in recovery from a disaster event (World Bank 2019). In Pakistan, cash transfers from the government after the 2010 extreme flood event resulted in a rapid recovery by allowing rural households to reconstruct their houses (World Bank 2013). Similarly, in Fiji, people who received cash transfers were more likely to quickly recover after tropical Cyclone Winston (Ivaschenko et al. 2020). In the global pandemic diseases like COVID-19, the paramount necessity of national social protection has become evident for recovery. A study indicated that social protection programs were employed to counterbalance the macroeconomic effects and support the living conditions of the vulnerable groups (Abdoul-Azize and El Gamil 2021). Recently, new literature indicated that such a pandemic could push people towards vulnerability and is expected to increase climate change impacts. Thus, the important role of government support needs to be recognized for better recovery from such a situation (Birkmann et al. 2022).

4.3 Future research directions

There is a need to understand context-specific issues to effectively design social protection programs. These issues should cover exposure, sensitivities, and capacities against external shocks. The programs should also acknowledge the drivers of poverty that need to be addressed. Further research must also be undertaken to understand multidimensional and complex risks to develop dynamic social protection strategies. More efforts on social protection interventions are required on slow-onset climate events, which is still

a nascent area. There is a need to design inclusive and detailed climate-resilient social protection strategies for supporting proactive measures in avoiding, minimizing, and addressing long-term impacts of slow-onset events on human health, livelihoods, poverty, and inequality.

In integrating social protection, DRR, and CCA programs, challenges remain regarding lack of awareness across sectors, roles and responsibilities, and the capacity to operationalize synergies. Implementing climate-adaptive social protection also faces challenges from financial sustainability, coordination with DRR, CCA, and humanitarian budget, and lack of ready and dedicated funds, where efforts should be dedicated to bringing budgetary and institutional coordination. Moreover, there is a need for further study on maladaptation to understand whether short-term adaptation efforts are weakening long-term solutions and avoiding overburdening social protection programs with additional objectives related to climate change adaptation.

There is a need for critical assessment, review, and monitoring outcomes of different social protection mechanisms against climate threats, e.g. objectives, design features, institutional set-ups and governance, and financial capacities. Shock-responsive systems are presently relying on systems' ability to deliver response faster, with attention given to technical aspects (e.g. forecasting, trigger, delivery mechanisms, etc.) rather than the impact on the recipients. This area warrants further research to ensure that shock-responsive programs effectively protect people from the impoverishing effects of climate shocks. The lack of concrete evidence on fostering transformative adaptation suggests that more research is needed to link transformation and adaptive social protection. There is a need to validate empirical evidence on best practices, programmes design, and collaboration to identify the most effective approach for integration.

5. Conclusion

Social protection is increasingly acknowledged as a tool to reduce vulnerability in disaster risk science and increase adaptive capacities for climate change adaptation. However, the concept of social protection is in its infancy, especially in the disaster and climate change domains. This study provides an insight into research and development trends regarding social protection, disaster risk reduction, and climate change adaptation. A bibliometric-based approach was to visualize and assess current research trends. The bibliometric analysis revealed that the social protection phenomenon is closely related to the concepts of vulnerability, adaptation, and resilience. The findings showed that the research on social protection is in its initial stage, but it is steadily growing with each passing year. There is a growing vast scientific literature for disaster risk reduction and climate change adaptation. Similarly, this study has identified the role of social protection and its interventions in disaster risk reduction and climate change adaptation. Social protection is increasingly seen as a tool for vulnerability reduction and building resilience, especially in rural communities.

Bibliometric and thematic analysis has methodological limitations. The foremost limitation was using the Web of Science database only, leading to database bias and underestimating social protection literature. The retrieved articles from the database were peer-

reviewed; therefore, no grey literature was used in this study. Moreover, preselected English language keywords can restrict the retrieval of all relevant articles. These limitations can significantly restrict scientific knowledge on social protection. Due to regular database updates, the retrieval of articles can vary, as new articles pertaining to social protection are being updated. Similarly, thematic analysis is a flexible method, and therefore different researchers can interpret it differently.

In conclusion, as an emerging research agenda, social protection options under different future- climate change scenarios must be studied. Future research could encompass more interconnected themes on social protection, disaster risk reduction, and climate change, which are still in their infancy. Themes like climate-induced migration and displacement, shock and humanitarian response, coverage, and process, technological innovation, etc., need to be analysed rigorously. This study proposes some evolving dimensions in this future exercise on social protection, disaster, and climate change – (i) rural dominance to urban focus; (ii) fragmented to comprehensive coverage; (iii) targeted beneficiaries to universal system, (iv) ad hoc programs to systematic, trigger or forecast based interventions; (v) reactive to proactive program design; (vi) manual to digitized process in assessment to distribution; (vii) integration of other risk transfer instruments in social protection portfolio; (viii) resilience to transformation; (ix) public and private partnerships; and (x) governance and justice among others. Researchers from developing and developed countries can extend collaborative efforts to generate more scientific evidence on these emerging interconnected themes. Studies should put forward policy recommendations on innovative social protection tools to tackle future climate change and its emerging risks.

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Data availability statement

The data will be provided upon a reasonable request.

References

Abdoul-Azize HT, El Gamil R. 2021. Social protection as a key tool in crisis management: learnt lessons from the COVID-19 pandemic. Glob Soc Welf. 8(1):107–116. doi:10.1007/s40609-020-00190-4.

Aleksandrova M. 2020. Principles and considerations for mainstreaming climate change risk into national social protection frameworks in developing countries. Clim Dev. 12(6):511–520. doi:10.1080/17565529.2019.1642180.

Aleksandrova M, Costella C. 2021. Reaching the poorest and most vulnerable: addressing loss and damage through social protection. Curr Opin Environ Sustain. 50:121–128. doi:10.1016/j.cosust.2021.03.010

Attride-Stirling J. 2001. Thematic networks: an analytic tool for qualitative research. Qual Res. 1 (3):385–405. doi:10.1177/146879410100100307.

Azeem MM, Mugera AW, Schilizzi S. 2019. Do social protection transfers reduce poverty and vulnerability to poverty in Pakistan? Household level evidence from Punjab. J Dev Stud. 55 (8):1757–1783. doi:10.1080/00220388.2018.1448068.

Bastagli F, Hagen-Zanker J, Harman L, Barca V, Sturge G, Schmidt T, and Pellerano L. 2016. Cash transfers: what does the evidence say?A rigorous review of programme impact and of the role of design and implementation features. London: ODI. https://cdn.odi.org/media/documents/11316.pdf. Accessed 10 06 2022.

Béné C, Newsham A, Davies M, Ulrichs M, Godfrey-Wood R. 2014. Resilience, poverty and development. J Int Dev. 26(5):598–623. doi:10.1002/jid.2992.

Béné C, Cornelius A, Howland F. 2018. Bridging humanitarian responses and long-term development through transformative changes—Some initial reflections from the World Bank's adaptive social protection program in the Sahel. Sustainability. 10(6):1697. doi:10.3390/su10061697.

Birkmann J, Liwenga E, Pandey R, Boyd E, Djalante R, Gemenne F, Filho WL, Pinho PF, Stringer L, and Wrathall D. 2022. Poverty, livelihoods and sustainable development. In: IPCC AR6 WG2 - Clim Chang 2022 impacts, adapt vulnerability. Cambridge University Press: Cambridge. https://report.ipcc.ch/ar6wg2/pdf/IPCC_AR6_WGII_FinalDraft_FullReport.pdf Accessed 10 06 2022.

Bowen T, Del Ninno C, Andrews C, Coll-Black S, Ugo Johnson K, Kawasoe Y, Kryeziu A, Maher B, and Williams A. 2020. Adaptive social protection : building resilience to shocks. Washington DC: World Bank. https://openknowledge.worldbank.org/handle/10986/33785. Accessed 10 06 2022.

Braun V, Clarke V. 2006. Using thematic analysis in psychology. Qual Res Psychol. 3(2):77–101 10.1191/1478088706qp063oa.

Carter MR, Janzen SA. 2018. Social protection in the face of climate change: targeting principles and financing mechanisms. Environ Dev Econ. 23(3):369–389 10.1017/S1355770X17000407.

Cecchini S. 2014. Social protection, poverty and inequality: a comparative perspective. J Southeast Asian Econ. 31(1):18–39. doi:10.1355/ae31-1b.

Chantarat S, Mude AG, Barrett CB, Turvey CG. 2017. Welfare impacts of index insurance in the presence of a poverty trap. World Dev. 94:119–138 doi:10.1016/j.worlddev.2016.12.044

Cluver LD, Toska E, Orkin FM, Meinck F, Hodes R, Yakubovich AR, Sherr L. 2016. Achieving equity in HIV-treatment outcomes: can social protection improve adolescent ART-adherence in South Africa? AIDS Care. 28(sup2):73–82. doi:10.1080/09540121.2016.1179008.

Coirolo C, Commins S, Haque I, Pierce G. 2013. Climate change and social protection in Bangladesh: are existing programmes able to address the impacts of climate change? Dev Policy Rev. 31:o74–o90. doi:10.1111/dpr.12040

Costella C, Jaime C, Arrighi J, Coughlan de Perez E, Suarez P, van Aalst M. 2017. Scalable and sustainable: how to build anticipatory capacity into social protection systems. IDS Bull. 48(4). 10.19088/1968-2017.151.

Cutter SL, Mitchell JT, Scott MS. 2000. Revealing the vulnerability of people and places: a case study of Georgetown County, South Carolina. Ann Assoc Am Geogr. 90(4):713–737. doi:10.1111/0004-5608.00219.

Davies M, Guenther B, Leavy J, Mitchell T, and Tanner T. 2009a. Climate change adaptation, disaster risk reduction and social protection: complementary roles in agriculture and rural growth? IDS Work Pap. (320):01–37. doi:10.1111/j.2040-0209.2009.00320_2.x.

Davies M, Guenther B, Leavy J, Mitchell T, Tanner T. 2009b. 'Adaptive Social Protection': synergies for poverty reduction. IDS Bull. 39(4):105–112. doi:10.1111/j.1759-5436.2008.tb00483.x.

Davies M, Béné C, Arnall A, Tanner T, Newsham A, Coirolo C. 2013. Promoting resilient livelihoods through adaptive social protection: lessons from 124 programmes in South Asia. Dev Policy Rev. 31(1):27–58. doi:10.1111/j.1467-7679.2013.00600.x.

de Janvry A, Ramirez Ritchie E, and Sadoulet E. 2016. Weather index insurance and shock coping : evidence from Mexico's CADENA program. Washington D.C: World Bank. https://openknowledge.worldbank.org/handle/10986/24632. Accessed 10 06 2022.

de Sherbinin A. 2014. Climate change hotspots mapping: what have we learned? Clim Change. 123 (1):23–37. doi:10.1007/s10584-013-0900-7.

Devereux S, McGregor JA, Sabates-Wheeler R. 2011. Introduction: social protection for social justice. IDS Bull. 42(6):1–9. doi:10.1111/j.1759-5436.2011.00265.x.

Devereux S, Solórzano A. 2016. Broadening social protection thinking. IDS Bull. 47(2). doi:10.19088/1968-2016.132.

Devereux S, Roelen K, Ulrichs M. 2016. Where next for social protection? IDS Bull. 47(4). 10.19088/1968-2016.158.

Dietrich S, Schmerzeck G. 2019. Cash transfers and nutrition: the role of market isolation after weather shocks. Food Policy. 87:101739. doi:10.1016/j.foodpol.2019.101739

Dulal HB, Shah KU. 2014. Climate-smart' social protection: can it be achieved without a targeted household approach? Environ Dev. 10:16–35. doi:10.1016/j.envdev.2014.01.003

Eriksen SH, Nightingale AJ, Eakin H. 2015. Reframing adaptation: the political nature of climate change adaptation. Glob Environ Chang. 35:523–533. doi:10.1016/j.gloenvcha.2015.09.014

Godfrey-Wood R, Flower BCR. 2018. Does guaranteed employment promote resilience to climate change? The case of India's Mahatma Gandhi national rural employment guarantee act (MGNREGA). Dev Policy Rev. 36:O586–O604. doi:10.1111/dpr.12309

Guest G, MacQueen KM, Namey EE. 2012. Applied thematic analysis. Thousand Oaks: SAGE Publications Ltd.

Hallegatte S, Bangalore M, Bonzanigo L, Fay M, Kane T, Narloch U, Julie Treguer D, and Vogt-Schilb A. 2016. Shock waves : managing the impacts of climate change on poverty. Washington DC: World Bank. https://openknowledge.worldbank.org/handle/10986/22787

Hallegatte S, Rozenberg J. 2017. Climate change through a poverty lens. Nat Clim Chang. 7 (4):250–256. 10.1038/nclimate3253.

Handayani SW, Cichon M, Carraro L, Villarroel MI, Bongestabs AF, Gassmann F, Weber A, Banzon E, Paredes KPP, and Hagemejer K. 2018. Asia's fiscal challenge: financing the social protection agenda of the sustainable development goals. Manila (Philippines). https://www.adb.org/publications/asia-fiscal-challenge-social-protection-agenda Accessed 10 06 2022.

Hansen J, Hellin J, Rosenstock T, Fisher E, Cairns J, Stirling C, Lamanna C, van Etten J, Rose A, Campbell B. 2019. Climate risk management and rural poverty reduction. Agric Syst. 172:28–46. doi:10.1016/j.agsy.2018.01.019

Heltberg R, Siegel PB, Jorgensen SL. 2009. Addressing human vulnerability to climate change: toward a 'no-regrets' approach. Glob Environ Chang. 19(1):89–99 10.1016/j.gloenvcha.2008.11.003.

Hossain MZ, and Rahman MAU. 2018. Pro-poor adaptation for the urban extreme poor in the context of climate change. Int J Clim Chang Strateg Manag. 10(3):389–406 doi:10.1108/IJCCSM-08-2016-0117. l

International Labour Organization. 2017. World social protection report 2017–19: universal social protection to achieve the sustainable development goal Accessed 10 06 2022. Geneva: International Labour Organization. http://www.ilo.org/wcmsp5/groups/public/—dgreports/—dcomm/—publ/documents/publication/wcms_604882.pdf

Ivaschenko O, Doyle J, Kim J, Sibley J, Majoka Z. 2020. Does 'Manna from Heaven' help? The role of cash transfers in disaster recovery—lessons from Fiji after Tropical Cyclone Winston. Disasters. 44 (3):455–476. doi:10.1111/disa.12411.

Karim A, Noy I. 2020. Risk, poverty or politics? The determinants of subnational public spending allocation for adaptive disaster risk reduction in Bangladesh. World Dev. 129:104901. doi:10.1016/j.worlddev.2020.104901

Kaur N, Agrawal A, Steinbach D, Panjiyar A, Panjiyar A, Saigal S, Manuel C, Barnwal A, Shakya C, and Norton A, et al. 2019. Building resilience to climate change through social protection: lessons from MGNREGS, India. London: IIED. https://pubs.iied.org/10197iied Accessed 10 06 2022.

Kidd S. 2017. Social exclusion and access to social protection schemes. J Dev Eff. 9(2):212–244. doi:10.1080/19439342.2017.1305982.

Kosec K, Mo CH. 2017. Aspirations and the role of social protection: evidence from a natural disaster in rural Pakistan. World Dev. 97:49–66. doi:10.1016/j.worlddev.2017.03.039

Kuriakose AT, Heltberg R, Wiseman W, Costella C, Cipryk R, Cornelius S. 2013. Climate-Responsive social protection. Dev Policy Rev. 31:o19–o34. doi:10.1111/dpr.12037

Lawlor K, Handa S, Seidenfeld D. 2019. Cash transfers enable households to cope with agricultural production and price shocks: evidence from Zambia. J Dev Stud. 55(2):209–226. doi:10.1080/00220388.2017.1393519.

Longhurst D, Evans S, Connolly D, Lung F, McCord A, Allan S, and Plichta M 2021. What are future financing options for shock responsive social protection? A technical primer Accessed 10 06 2022. https://reliefweb.int/report/world/space-what-are-future-financing-options-shock-responsive-social-protection-technical

Lybbert TJ, and Carter MR. 2015. Bundling drought tolerance and index insurance to reduce rural household vulnerability to drought. Sustain Econ Dev. 401–414 doi:10.1016/B978-0-12-800347-3.00022-4.

Malerba D. 2021. Cliamte change. In: Schüring E, Loewe M, editors. Handb soc prot syst. Cheltenham: Edward Elgar Publishing; p. 688–704.

Mersha AA, van Laerhoven F. 2018. The interplay between planned and autonomous adaptation in response to climate change: insights from rural Ethiopia. World Dev. 107:87–97. doi:10.1016/j.worlddev.2018.03.001.

Mesquita P, Bursztyn M. 2016. Integration of social protection and climate change adaptation in Brazil. Br Food J. 118(12):3030–3043 10.1108/BFJ-02-2016-0082.

Midgley J 2020. Inequality, social protection and social justice. Accessed 10 06 2022. Massachusetts: Edward Elgar Publishing. https://www.elgaronline.com/view/9781789905571.xml

Naeem N, Rana IA. 2020. Tourism and disasters: a systematic review from 2010–2019. J Extreme Events. 07(01n02):2030001. doi:10.1142/S234573762030001X.

Nowell LS, Norris JM, White DE, Moules NJ. 2017. Thematic analysis. Int J Qual Methods. 16 (1):160940691773384. doi:10.1177/1609406917733847.

O'Brien C, Holmes R, Scott Z, and Valentina B. 2018. Shock-responsive social protection systems toolkit: appraising the use of social protection in addressing large-scale shocks. Oxford: Oxford. https://www.opml.co.uk/files/Publications/a0408-shock-responsive-social-protection-systems/srsp-toolkit.pdf?noredirect=1. Accessed 10 06 2022.

Omiti J, and Nyanamba T. 2007. Using social protection policies to reduce vulnerability and promote economic growth in Kenya. Brighton: Future Agricultures. http://www.future-agricultures.org/wp-content/uploads/pdf-archive/FAC_Discussion_Paper_012.pdf Accessed 10 06 2022.

Osabohien R, Matthew O, Ohalete P, Osabuohien E. 2020. Population–Poverty–Inequality nexus and social protection in Africa. Soc Indic Res. 151(2):575–598. doi:10.1007/s11205-020-02381-0.

Pelling M, O'Brien K, Matyas D. 2015. Adaptation and transformation. Clim Change. 133(1):113–127. doi:10.1007/s10584-014-1303-0.

Petzold J, Andrews N, Ford JD, Hedemann C, Postigo JC. 2020. Indigenous knowledge on climate change adaptation: a global evidence map of academic literature. Environ Res Lett. 15 (11):113007. doi:10.1088/1748-9326/abb330.

Plagerson S, Ulriksen MS. 2016. Can social protection address both poverty and inequality in principle and practice? Glob Soc Policy. 16(2):182–200. doi:10.1177/1468018115622521.

Prifti E, Daidone S, Pace N, Davis B. 2019. Unconditional cash transfers, risk attitudes and modern inputs demand. Appl Econom. 53:100–118.
Roberts E, Pelling M. 2018. Climate change-related loss and damage: translating the global policy agenda for national policy processes. Clim Dev. 10(1):4–17. doi:10.1080/17565529.2016.1184608.
Roelen K, Longhurst D, and Sabates-Wheeler R. 2018. The role of cash transfers in social protection, humanitarian response and shock-responsive social protection. Brighton: IDS. https://opendocs.ids.ac.uk/opendocs/handle/20.500.12413/14081 Acessed 10 06 2022.
Rowling M 2021. COP26:Push on climate action in pandemic shows strength of Paris pact. Reuters. [accessed 2021 Nov 14]. https://www.reuters.com/business/cop/push-climate-action-pandemic-shows-strength-paris-pact-undp-chief-2021-11-11/
Roy J, Tschakert P, Waisman H, Halim SA, Antwi-Agyei P, Dasgupta P, Hayward B, Kanninen M, Liverman D, and Okereke C, et al. 2018. Sustainable development, poverty eradication and reducing inequalities. In: Masson-Delmotte V, Zhai P, Pörtner H-O, Roberts D, Skea J, Shukla PR, Pirani A, Moufouma-Okia W, Péan C, Pidcock R, et al. editors. Glob warm 15°C An IPCC spec rep impacts glob warm 15°C above pre-industrial levels relat glob greenh gas emiss pathways, context strength glob response to threat clim chang. Cambridge: Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_Chapter5_Low_Res.pdf. Accessed 10 06 2022.
Ruel MT, Alderman H. 2013. Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition? Lancet. 382(9891):536–551 10.1016/S0140-6736(13)60843-0.
Rutkowski M, Bousquet F 2019. Social protection: protecting the poor and vulnerable during crises. World Bank Blogs. [accessed 2021 Nov 13]. https://blogs.worldbank.org/dev4peace/social-protection-protecting-poor-and-vulnerable-during-crises
Schilling J. 2006. On the Pragmatics of Qualitative Assessment. Eur J Psychol Assess. 22(1):28–37. doi:10.1027/1015-5759.22.1.28.
Schwan S, and Yu X. 2018. Social protection as a strategy to address climate-induced migration. Int J Clim Chang Strateg Manag. 10(1):43–64 doi:10.1108/IJCCSM-01-2017-0019.
Sett D, Hagenlocher M, Cotti D, Reith J, Harb M, Kreft S, Kaiser D, Zwick A, Garschagen M. 2021. InsuRisk Report 2021: disaster risk, social protection and readiness for insurance solutions. Bonn. http://collections.unu.edu/view/UNU:8332.
Siddiqi A. 2011. Supporting the working but vulnerable: linkages between social protection and climate change. Clim Dev. 3(3):209–227. doi:10.1080/17565529.2011.598365.
Sovacool BK. 2018. Bamboo beating bandits: conflict, inequality, and vulnerability in the political ecology of climate change adaptation in Bangladesh. World Dev. 102:183–194. doi:10.1016/j.worlddev.2017.10.014
Stavropoulou M, Holmes R, Jones N. 2017. Harnessing informal institutions to strengthen social protection for the rural poor. Glob Food Sec. 12:73–79. doi:10.1016/j.gfs.2016.08.005
Tenzing JD. 2020. Integrating social protection and climate change adaptation: a review. WIREs Clim Chang. 11(2). doi:10.1002/wcc.626.
Terry G, Hayfield N, Clarke V, Braun V. 2017. Thematic Analysis. In: Willig C, Rogers WS, editors. SAGE Handb Qual Res Psychol. 2nd ed. London: SAGE Publications Ltd; p. 17–37.
Tucker J, Daoud M, Oates N, Few R, Conway D, Mtisi S, Matheson S. 2015. Social vulnerability in three high-poverty climate change hot spots: what does the climate change literature tell us? Reg Environ Chang. 15(5):783–800. doi:10.1007/s10113-014-0741-6.
Ulrichs M, Slater R, Costella C. 2019. Building resilience to climate risks through social protection: from individualised models to systemic transformation. Disasters. 43(S3):S368–S387. doi:10.1111/disa.12339.
UNISDR. 2012 Accessed 10 06 2022. How to make cities more resilient. Geneva: UNISDR. papers2://publication/uuid/B373630D-8F1B-498A-AE60-0EF0E2D509E8
UNISDR. 2015. Sendai framework for disaster risk reduction 2015 - 2030. Sendai: UNISDR Accessed 10 06 2022.

United Nations. 2015. Transforming our world: the 2030 agenda for sustainable development. New York: United Nations. https://sustainabledevelopment.un.org/post2015/transformingourworld/publication Accessed 10 06 2022.

United Nations. 2021. Closing the climate risk protection gap: lessons learnt from different levels of governance Accessed 10 06 2022. https://www.youtube.com/watch?v=t7_8iUD26bk

United Nations Development Programme. 2016. Leaving no one behind: a social protection primer for practitioners. New York: United Nations Development Programme. https://www.undp.org/content/undp/en/home/librarypage/poverty-reduction/-leaving-no-one-behind–a-social-protection-primer-for-practitio.html Accessed 10 06 2022.

Weldegebriel ZB, Prowse M. 2013. Climate-Change adaptation in Ethiopia: to what extent does social protection influence livelihood diversification? Dev Policy Rev. 31:o35–o56. doi:10.1111/dpr.12038

Wilkinson E, Weingartner L, Choularton R, Bailey M, Todd M, Kniveton D, Courtenay CV. 2018. Forecasting hazards, averting disasters: implementing forecast-based early action at scale. London: Overseas Development Institute.

Winder Rossi N, Spano F, Sabates-Wheeler R, and Kohnstamm S. 2017. Social protection and resilience: supporting livelihoods in protracted crises and in fragile and humanitarian contexts. Rome: FAO. https://www.fao.org/3/i7606e/i7606e.pdf. Accessed 10 06 2022.

Winsemius HC, Jongman B, Veldkamp TIE, Hallegatte S, Bangalore M, Ward PJ. 2018. Disaster risk, climate change, and poverty: assessing the global exposure of poor people to floods and droughts. Environ Dev Econ. 23(3):328–348 10.1017/S1355770X17000444.

World Bank. 2013. Building resilience to disaster and climate change through social protection. Washington D.C: World Bank. https://openknowledge.worldbank.org/handle/10986/16492. Accessed 10 06 2022.

World Bank. 2018. The state of social safety nets 2018. Washington DC: World Bank. Internet. http://hdl.handle.net/10986/29115 Accessed 10 06 2022.

World Bank. 2019. Social protection and disaster recovery. Washington D.C: World Bank. https://www.gfdrr.org/sites/default/files/publication/Social_Protection_Guidance_Note_FINAL.pdf Accessed 10 06 2022.