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Future research directions for climate-sensitive social protection

Bina Desai[1,*], Peter Läderach[2], George Meddings[2], Raramai Campbell[2]

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Abstract

The limited global coverage of social protection, fragmented adaptation efforts, and a volatile political and security situation in the Sahel mean that the ambitions of existing social protection approaches may miss the mark. Better understanding the barriers to scaling up and the avenues towards prudently adapting existing programs would be a first step in designing impactful national systems. This article builds on a global review and a regional study in the Sahel on the potential alignment of climate adaptation and social development finance in low-income communities. The hypothesis is that rather than radically redesigning programs to make them respond to a broad range of climate risks, enhancing existing mechanisms by integrating climate risk information in program design may yield better results. However, a lack of in-depth studies of national and regional experience means that valuable lessons are not captured. Recent, promising investments in Mauritania and the wider Sahel region in developing and maintaining nationally owned social registries, and in making provisions for fragile contexts and displaced populations, are not sufficiently documented. This gap opens up a research agenda on the role of adaptive social protection in climate action in sub-Saharan Africa and beyond.

Keywords: *climate adaptation, social protection, climate risk, Sahel, Mauritania*

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1. Introduction

Social protection globally suffers from a broad range of challenges, including low and unequal coverage, particularly in low-income countries, insufficient benefit levels, a focus on short-term coping and crisis buffering, rather than building long-term resilience, and fragmented program approaches and investment [1]. In addition, a lack of robust governance for social protection, including institution-building and accountability mechanisms, is exacerbated by insufficient integration of relevant information, e.g., on weather-related risks or migrants and displaced populations, and a weak evidence base.

Against this backdrop, more recent efforts to link social protection outcomes more closely to climate change adaptation objectives in the Sahel region, while promising, need to become more rooted in evidence of what determines success or failure. Challenges, which include chronic poverty and social inequalities that are hindering socio-economic programs, are worsened by the effects of climate change [2]. Rising temperatures, along with frequent droughts and floods, have a devastating impact on agriculture and livestock, and displace millions annually [3]. Land degradation and water scarcity, often a result of unsustainable land use practices, are further limiting the resource base of farming and herder communities, and, in some instances, by the displacement of whole communities as observed in Niger [4]. Political instability, particularly in Burkina Faso, Mali, and Niger, and volatile global food markets and pricing present further risks to local food security. The 2023 lean season was particularly severe, leaving over 10 million people facing food insecurity [5]. In this context, social protection plays a crucial role, often through community-based support systems [6]. Such mechanisms work for small crises but may fail with recurring disasters, significant and long-term environmental degradation, and chronic poverty when resources across the community are severely eroded. Previous studies have identified such instances where individual, household, and community adaptive capacities have been exceeded, triggering behavior change or new technological responses, as social tipping points [7].

Over the past decade, several countries have expanded formal social protection, with some implementing national systems and others focusing on seasonal support or regional hotspots. Efforts to make these programs financially sustainable and climate-resilient have led to a growing recognition of the shared goals of social protection and climate change adaptation, and concepts such as shock-responsive, adaptive, and transformative social protection have emerged in research and policy discourse [8–13]. However, concrete policy and practical changes are limited and existing examples not systematically documented. As a result, there is little insight into how integrating social inclusion and climate resilience affects agricultural and community practices in the immediate as well as the long term. In some cases, evidence seems to suggest that adjustments may be necessary in targeting or scaling interventions, rather than altering the core actions themselves, but more research is needed into the longer-term changes and transformations that are feasible.

[1]Climate Security Team, Bioversity International, Rome, Italy.
[2]Climate Security Team, CIAT, Cali, Colombia.
*email: b.desai@cgiar.org

2. Materials and methods

This communication is based on a global review of adaptive social protection today, in particular, on a case study from the Sahel region [14, 15]. A global literature review mapped the evolution of concepts and debates related to social protection and climate change adaptation over the past decades. It also included a review of existing national social protection systems and programs delivered by non-governmental actors, including international organizations, as well as expert interviews with representatives from humanitarian and development organizations, governments, and the science community.

For the case study, the region-specific literature was examined, including peer-reviewed publications, gray literature from humanitarian organizations and expert institutions, and relevant datasets from the World Bank, the World Food Programme, UN agencies, and national government departments. Online interviews with experts based in the Sahel were conducted in preparation for the country visit, which generated contextual insights as well as additional research and program materials shared by the interview partners.

In the region, key informant interviews were held and consultation workshops conducted in Mauritania and Senegal. All interviews in the two countries were held after receiving informed consent, conducted in-person in French or English depending on the preference of the interview partner, and were semi-structured, with prepared questions tailored to each interview partner.

First insights from the study were shared at a final workshop with key actors in the SASPP in Dakar, Senegal, and via email with those not based in the country. The feedback received was then incorporated into the write-up, and subsequent drafts were shared with interview participants and friendly reviewers for final feedback.

3. Results and discussion

The global review and regional studies found that linking social protection instruments with climate-smart practices, such as climate risk analysis and land restoration, holds much potential for accelerated positive impacts [14, 15]. However, key challenges were shown to be reactive and short-term program approaches, the limited use of climate risk data and impact evaluations, fragmented policies and governance systems, and major resource constraints. Despite these issues, examples from India's national social safety net program (MGNREGA) and a regional adaptive social protection program in the Sahel demonstrated that leveraging a stronger evidence base to inform targeting, early warning, financing, and cross-sector collaboration could support scaling and improved outcomes [16]. India's MGNREGA, at least in principle, presents a relatively mature and integrated model for adaptive social protection, for example, by tying land restoration to long-term resilience in its public work programs. In Jordan, social protection is well established in national policy, but gaps in coverage, siloed institutional mandates, particular with regard to social assistance for displaced communities, a lack of climate vulnerability targeting, and the absence of long-term resilience building are key challenges [17].

In the Sahel, there are several national social protection systems fully owned and implemented by government bodies as well as area-wide programs delivered with the support of humanitarian agencies and development partners. Some of these generate climate adaptation outcomes, either directly or indirectly, thereby producing co-benefits beyond the immediate program objectives. However, the concrete ways in which to combine adaptation actions with social innovations are not always clear-cut or easily achievable, nor are changes in approaches and their impact systematically documented and assessed.

Broader impact evaluations are scarce, and most assessments are of project outputs or immediate individual outcomes rather than longer-term impact on community and systems resilience. Longitudinal studies, linking social protection interventions to positive community outcomes that can be quantified or assessed in terms of perceptions of reduced vulnerability would start filling this gap. Similarly, there is a need for more systematic reviews and assessments of pilots and programs that bundle interventions, such as cash with training on climate-smart agricultural practices plus access to weather- and climate-related risks. Two overarching research question emerge, which—if answered—could significantly contribute to improving and scaling existing social protection mechanisms.

3.1. What type of risk assessments could truly improve the design and targeting of social protection in the context of accelerating climate change?

Seasonal forecasts and climate change scenarios, weather-related information, and data on land use can inform vulnerability mapping exercises and targeting for social protection programs [13]. Climate and environmental change, including land degradation, is sometimes referenced in national social welfare policies and in chapeau text of social protection programs in the Sahel, but associated risks are not usually explicitly considered in the design of the instruments used. In Mauritania, for instance, the national social protection system—particularly its social registry—is geared toward supporting long-term assistance through cash transfers and complementary programs targeting vulnerable populations [18]. This aligns with the country's poverty reduction strategy and is not inherently problematic. Nonetheless, recurring and increasingly severe food crises, driven by droughts and exacerbated by events such as the COVID-19 pandemic, have prompted calls for the government and its partners to strengthen the system's capacity to respond to shocks.

Despite the growing urgency, however, program targeting still relies heavily on indicators related to food security and nutrition in high-risk areas as well as other conventional poverty metrics. While data on rainfall patterns and seasonal forecasts are occasionally factored into strategic assessments, such as identifying areas for surveys, this integration is neither systematic nor consistent. Instead, whether the integration of such information happens more often than not depends on the initiative and priorities of individual actors. There is increasing recognition of the value of incorporating climate risk information more deliberately into the design and targeting of social protection tools. However, the lack of robust evidence makes it difficult to determine which types of information are most useful, and how exactly they should be applied.

For example, data on the expected impacts of climate change in specific locations, such as increased flood risk and associated damage to assets, or drought risk and related loss of livelihoods

and income, is critical but can be hard to collect and make sense of for strategic and time-sensitive planning. Understanding better what type of data on climate-related vulnerability and exposure is required would be essential. In addition, information on the risks emerging from land degradation as well as potential benefits from landscape restoration practices is a critical piece that is largely missing in assessments used as a basis for planning [1].

Importantly, while data collection tools and methods for analysis exist, there are not usually enough resources to perform assessments at the required scale. And making the case for additional resources is faced with an already limited fiscal space and can be difficult without knowing how best to target the resources. Therefore, more documentation of successful examples of and research on the feasibility and effectiveness of integrating weather-related risk information and climate vulnerability assessments in the form of GIS mapping data, risk assessments, and qualitative vulnerability assessments into social registries is needed. Further, in-depth case studies on how climate-informed social registries can improve the responsiveness and effectiveness of delivery mechanisms would provide a basis for more investment in solid data systems. Finally, studies are required that provide evidence of this, resulting in improved targeting and the inclusion of particularly at-risk and marginalized populations.

3.2. What types of data systems can support improved targeting and sustained monitoring of impact?

In the face of limited resources for data collection, data systems, and their maintenance, the question of data structures and their governance is critical. Where national coverage of regularly updated demographic, socio-economic, and environmental data may be impossible to obtain, new modular data structures can be a helpful tool to obtain a better understanding of localized risk. For this, the potential of "dynamic social registries", which can include key development indicators as well as metrics related to vulnerability and exposure to hazards, has been highlighted [5]. One key advantage of such dynamic social registries is that they would provide more current information than commonly used household censuses or surveys. Another is that additional data layers, such as geo-located weather data or land cover and land degradation, could be added, providing valuable information on assessments of seasonal forecasts of droughts or other risks.

The Mauritanian national social registry is a good example: since its inception in 2014, it has continuously grown and today covers the entire population. The targeting of social protection programs is based on the registry as is the delivery of many health and education services, particularly in remote regions. The Mauritanian registry was built following clearly documented processes and guidance and maintained and used by mandated institutions [18]. Information in the registry is based on household surveys that are conducted on a four-year cycle using indicators of vulnerability identified through a community-led process and can therefore be used as a basis not just for social assistance but also for planning primary health care interventions and school feeding programs. In times of crises, such a system can also provide necessary information for the distribution of rapid and targeted assistance.

However, the challenge lies in keeping registry data current and in incorporating more indicators, such as indicators that could capture environmental and land use changes over time. In this regard, traditional, monolithic data structures are unsuitable for social registries with such a broad purpose and which require frequent updates. Instead, "dynamic social registries" could be one of the solutions to enhance targeting, scaling, and coordination among line ministries and humanitarian and development partners. Their modular approach means that questionnaires and the resulting data dashboards can be modularized into "data Lego blocks" [5]. This would allow for climate information, which may need more frequent updates than demographic data, to be integrated into the registry, complementing its core structure (**Figure 1**).

The concept is strong, but the evidence base of its application and success is still limited, and more study is required of how such registries could be built and utilized in order for them to become useful tools for improved coordination and "climate-proofing" social protection systems. A better understanding of what drives or blocks cross-sector coordination is needed and could be achieved by the systematic and context-specific study of the institutional incentives that can enable (or disincentives that may hinder) cooperation across ministries and departments in baseline assessments and data collection, the delivery of services, and joint monitoring and analysis.

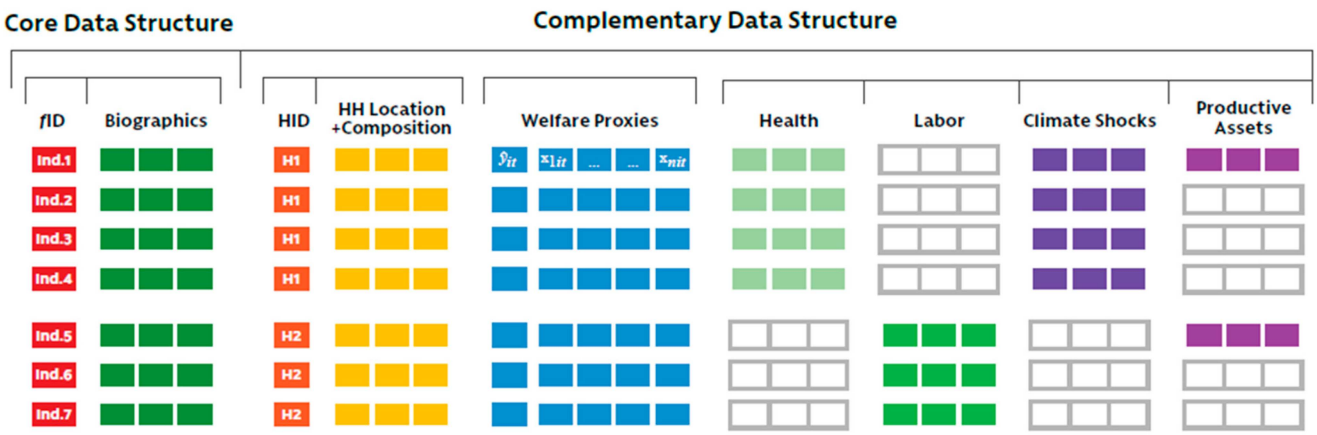

Figure 1 • Modular data structure of a dynamic social registry. Source: SASPP 2023 [5], reproduced with permission from the World Bank group.

Where these registries may also need to cover displaced populations or areas affected by conflict and violence, additional considerations must be taken into account. Currently, fragility is not systematically considered in regional or national approaches to social protection, and those displaced by conflict regularly fall through the cracks of national systems [17]. More research on how to deliver social protection that is climate-sensitive in contexts affected by fragility, violence, and conflict is required [19]. Studies of this nature can use methods developed by and build on lessons learned from other research disciplines, for example, on how to deliver health care in areas controlled by non-state armed groups or implement disaster risk reduction in fragile countries. Further, studies of this nature should be coupled with research on contingency financing tools, such as sovereign catastrophe risk funds and insurance, and their potential link to social protection schemes, as well as cost–benefit analyses of pre-arranged versus reactive financing for longer-term versus short-term approaches to social protection.

4. Conclusions

Social protection interventions in the Sahel are often delivered against a backdrop of high levels of insecurity and socio-economic deprivation. In addition, the impacts of increasingly harmful environmental and climate change can be expected to further intensify pressures on existing social protection programs, even as limited resources mean that shock buffering through improved preparedness and humanitarian response becomes prioritized over long-term and social assistance and resilience-building programs. Globally, less than half of the population is covered by one or more social protection benefits, and in Africa less than 17.4 per cent [20, 21]. In light of these numbers, ambitious goals for global social protection may be unrealistic, and community-based approaches as well as programs anchored in broader local development strategies may be a good starting point for developing national systems. At the global level, this would respond directly to a recognized need to assess progress against individual Sustainable Development Goals, from poverty to climate action to life on land, in a connected manner, providing a basis for more cohesive planning [22].

In the current context of reduced international finance for development and international aid, entirely new approaches to social protection as well as to climate change adaptation may also face pushback from donors and national governments. Lessons from the Sahel region show that prudently but significantly scaling up existing programs may be more impactful than redesigning national systems. Social protection measures, though not specifically designed for long-term climate resilience, may nevertheless contribute to the strengthening of adaptation capacities and resilience to shocks [23]. For this to happen, more research on what types of context-specific and pragmatic yet potentially transformative approaches can be developed, and what data systems must support them, is needed. Research questions would include what adaptations would be necessary to make when transferring the positive experience of one social protection program to a different context and what the conditions would be to scale and sustain them, or how community-based organizations and traditional authorities can become integrated in the planning and delivery of formal social protection programs.

Future research required includes more systematic and multi-year impact evaluations of existing social protection programs that claim to integrate climate change adaptation objectives into their instruments; a combination of qualitative and quantitative assessments of vulnerability as well as opportunities for at-risk groups to improve targeting; studies on how to successfully integrate climate risk information and early warning into social registries; research on innovative financing mechanisms and the scalability of project-based approaches; and the documentation of governance gaps and opportunities at local and national levels, as well as lessons learned from other sectors, to support institutional capacities for long-term system resilience building.

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Author contributions

Conceptualization, B.D. and P.L.; methodology, B.D., P.L., R.C. and G.M.; validation, B.D., R.C. and G.M.; formal analysis, B.D., R.C. and G.M.; investigation, B.D.; writing—original draft preparation, B.D.; writing—review and editing, B.D., P.L., R.C. and G.M.; supervision, P.L.; project administration, P.L. and B.D.; funding acquisition, P.L. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare that they have no competing interests. The sponsors played no role in the conception, execution, interpretation, or writing of this manuscript.

Data availability statement

Data supporting these findings are stored with CGIAR and are available upon request.

Institutional review board statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of the Alliance Bioversity & CIAT on 2023 Aug 29.

Informed consent statement

Informed consent for participation was obtained from all subjects involved in the study.

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References

1. Tenzing JD. Integrating social protection and climate change adaptation: a review. WIREs Clim Change. 2020;11(2):58. doi: 10.1002/wcc.626

2. van Niekerk AJ. Inclusive economic sustainability: SDGs and global inequality. Sustainability. 2020;12:5427. doi: 10.3390/su12135427

3. IDMC. Global Report on Internal Displacement 2023. Internal Displacement and Food Security. Geneva: IDMC; 2023. [accessed on 2025 Feb 12]. Available from: https://www.internal-displacement.org/global-report/grid2023/

4. UN-Habitat and GNTL. Land degradation and conflict: case studies from Sudan, Jordan and Niger. 2022. [accessed on 2025 Jan 24]. Available from: https://gltn.net/2022/11/07/land-degradation-and-conflict-case-studies-from-sudan-jordan-and-niger/

5. SASPP. Sahel Adaptive Social Protection Programme. Annual report fiscal year 2023. Washington DC: World Bank; 2023. [accessed on 2025 Jan 16]. Available from: https://documents1.worldbank.org/curated/en/099635009192317118/pdf/IDU03f4125650dae504bd00b97a05226295cde41.pdf

6. Aleksandrova M, Costella C. Reaching the poorest and most vulnerable: addressing loss and damage through social protection. Curr Opin Environ Sustain. 2021;50:121–8. doi: 10.1016/j.cosust.2021.03.010

7. Juhola S, Filatova T, Hochrainer-Stigler S, Mechler R, Scheffran J, Schweizer P-J. Social tipping points and adaptation limits in the context of systemic risk: concepts, models and governance. Front Clim. 2022;4:1009234. doi: 10.3389/fclim.2022.1009234

8. Sengupta S, Dahlet G. Policy coherence between social protection and climate action: initial findings from global studies and projects. The Hague: Red Cross Red Crescent Climate Centre; 2023. [accessed on 2025 Feb 4]. Available from: https://www.climatecentre.org/wp-content/uploads/RCCC-SP-CC-policy-coherence-Brief-V4.pdf

9. Aleksandrova M. The untapped potential of global climate funds for investing in social protection. Briefing Paper 7/2021. Bonn: DIE; 2021. doi: 10.23661/bp7.2021

10. Kuriakose AT, Heltberg R, Wiseman W, Costella C, Cipryk R, Cornelius S. Climate-responsive social protection. Dev Policy Rev. 2012;31:19–34. doi: 10.1111/dpr.12037

11. Solórzano A, Cárdenes I. Social protection and climate change: WFP Regional Bureau for Latin America and the Caribbean's vision to advance climate change adaptation through social protection. Rome: WFP and OPM; 2019. [accessed on 2024 Dec 12]. Available from: https://www.wfp.org/publications/2019-occasional-paper-no-26

12. World Bank. Sahel Adaptive Social Protection Programme [webpage]. Washington (DC): World Bank; 2024. [accessed on 2024 Jun 18]. Available from: https://www.worldbank.org/en/programs/sahel-adaptive-social-protection-program-trust-fund

13. Daron J, Allen M, Bailey M, Ciampi L, Cornforth R, Costella C, et al. Integrating seasonal climate forecasts into adaptive social protection in the Sahel. Clim Dev. 2020;13(6):543–50. doi: 10.1080/17565529.2020.1825920

14. Desai B, Meddings G, Campbell R, Laderach P. Adaptive social protection: a persistent illusion or the way forward for climate adaptation and social inclusion? 2023. [accessed on 2025 Jan 18]. Available from: https://hdl.handle.net/10568/135126

15. Desai B, Meddings G, Laderach P, Campbell R. Reactive assistance or proactive protection? Social protection and climate resilience in the Sahel region. 2023. [accessed on 2025 Jan 18]. Available from: https://hdl.handle.net/10568/135122

16. Campbell R, Desai B, Laderach P. Social protection as a stepping stone towards transformative climate resilience: the case of India's Mahatma Gandhi National Rural Development Program (MGNREGA). 2023. [accessed on 2025 Jan 18]. Available from: https://hdl.handle.net/10568/135124

17. Meddings G, Desai B, Jaskolski M, Schapendonk F, Läderach P. Barriers to developing social protection programs with adaptation considerations: the case of Jordan. 2023. [accessed on 2025 Jan 18]. Available from: https://hdl.handle.net/10568/135118

18. Government of Mauritania. Stratégie nationale de protection sociale en Mauritanie. Nouakchott: Government of Mauritania. Nouakchott: Government of Mauritania; 2012. [accessed on 2025 Feb 4]. Available from: https://masef.gov.mr/fr/node/101

19. Gray Meral A, Both N. Social protection and forcibly displaced people: a literature review. London: ODI; 2021. [accessed on 2024 Nov 5]. Available from: https://cdn.odi.org/media/documents/Social_protection_and_forcibly_displaced_people.pdf

20. Aleksandrova M, Sengupta S, Costella C, Singh H, Paul H. Social protection for climate-induced loss and damage. Priority areas for increasing capacity and investment in developing countries. The Hague: Red Cross Climate Centre, DIE-GDI and Action Aid; 2023. [accessed on 2024 Nov 5]. Available from: https://www.climatecentre.org/wp-content/uploads/Social-protection-and-LD_RCCC_ActionAid_DIE-1-1.pdf

21. WFP. The evolution of social protection. Rome: WFP; 2023. [accessed on 2025 Feb 21]. Available from: https://www.wfp.org/publications/evolution-social-protection

22. Fuldauer LI, Thacker S, Haggis R, Fuso-Nerini F, Nicholls RJ, Hall JW. Targeting climate adaptation to safeguard and advance the Sustainable Development Goals. Nat Commun. 2022;13(1):3579. doi: 10.1038/s41467-022-31202-w

23. Costella C, McCord A, van Aalst M, Holmes R, Ammoun J, Barca V. Social protection and climate change: scaling up ambition. London: SPACE, DAI Global UK Ltd; 2021. [accessed on 2024 Nov 5]. Available from: https://socialprotection.org/sites/default/files/publications_files/Paper%20-%20Social%20Protection%20and%20Climate%20Change_%20Scaling%20up%20Ambition%20%281%29%20%281%29_0.pdf