



Data and Information Systems for Adaptive Social Protection

A rapid review of the evidence and
knowledge gaps

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Abstract

As part of the Adaptive Social Protection: Evidence for Child Outcomes (ASPECT) research programme initiated by UNICEF and the German Federal Ministry for Economic Cooperation and Development (GIZ), this report investigates the latest evidence and knowledge gaps related to data and information systems for Adaptive Social Protection (ASP). ASP aims to help vulnerable households and communities prepare for, cope with, and adapt to covariate shocks such as natural disasters, economic crises, pandemics, conflicts, and forced displacement.

Through a comprehensive literature review, expert consultations, and an online survey of UNICEF personnel, the study focuses on two broad areas. First, the extent to which disaster and climate risk, early warning, and post-shock needs data and analysis are integrated into social protection policy, planning, and preparedness, and what enables or constrains this. Second, the characteristics of registries and data systems that support effective delivery of social protection in fragile and humanitarian contexts and in response to shocks.

The findings reveal a range of technical and political barriers that prevent effective integration of disaster and climate risk data, including from disaster risk information systems (DRIS), into social protection policy and planning, including linking to early warning systems. Innovative approaches such as Impact-Based Forecasting (IbF) and the use of Big Data offer opportunities but also come with risks and have not yet been tested in national systems. Post disaster data collection for social protection is not standardised and rarely institutionalised. Further, the findings indicate that social protection information systems (SPIS) can vary significantly in their level of maturity with implications for their ability to support expansion in response to shocks. Challenges include incomplete data and lack of relevance to disaster risk and currency, pointing to the need to strengthen SPIS for ASP at different levels including legal and policy frameworks, institutional capacity and preparedness, mechanisms for rapid expansion, interoperability with other information systems, and data protection and privacy.

The review highlights several key knowledge gaps including:

- ▶ How to integrate disaster risk data, including for early warning, into social protection policy and planning including overcoming sectoral divides and other barriers, especially in conflict contexts and in relation to the longer-term impacts of climate change.
- ▶ Standardised approaches to post-disaster household assessments that are harmonised and integrated with SPIS.
- ▶ Improving data quality for SPIS including relevance to disaster risk and resilience, and finding the optimal balance between speed and comprehensive data collection.
- ▶ Approaches to extending SPIS coverage to hard-to-reach areas and excluded populations, such as migrants, and minimising exclusion in different contexts.
- ▶ How humanitarian actors can best use national information systems, especially in contexts where the broader legal framework and institutions are weak.

The report concludes with recommendations for future research to address these gaps and enhance the effectiveness of data and information systems for ASP in fragile and humanitarian contexts, aiming to inform policy makers, practitioners, and researchers engaged in this field.

About ASPECT

Adaptive Social Protection: Evidence for Child Outcomes in Fragile Settings (ASPECT) is a thematically focused five-year research project nested within the evaluation partnership between the German Federal Ministry for Economic Cooperation and Development (BMZ) and the UNICEF Evaluation Office. It is a collaborative effort between the UNICEF Evaluation Office, the Programme Group Social Policy Section, UNICEF Innocenti – Global Office of Research and Foresight, and the Division of Data, Analytics, Planning and Monitoring.

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Abbreviations and acronyms

ASP	Adaptive social protection
DMIS	Disaster management information system
DRIS	Disaster risk information system
DRM	Disaster risk management
ESLP	Employment, livelihoods, and social protection
EWS	Early warning system
HSNP	Hunger safety net programme
IbF	Impact-based Forecasting
LOUISE	Lebanon One Unified Inter-Organisational System for E-cards
PDHA	Post-disaster household assessment
PDIA	Post-disaster impact assessment
SPIS	Social protection information system
VCI	Vegetation condition index

1. Introduction

People around the world are increasingly affected by interrelated and often catastrophic covariate shocks, such as natural disasters, economic crises, pandemics, conflicts and forced displacement.

Those already living in poverty or those that are vulnerable based on other characteristics such as age, disability, gender, and refugee status, are often left even worse off during and after those events. In fragile and humanitarian contexts, adaptive social protection (ASP) is critical to help households and communities prepare for, cope with, and adapt to covariate shocks and stressors, including those exacerbated by climate change.¹ Over the long term, ASP can provide a pathway to a more resilient state for households that may otherwise lack the resources to move out of chronically vulnerable situations.

Fragile and humanitarian contexts epitomize some of the greatest challenges in establishing and maintaining effective social protection systems. They can be characterised by weak governance, low state capacity, political instability, limited resources and, in some cases, violence and physical insecurity (UNICEF, 2018). To be effective, social protection systems and programmes must integrate disaster and climate risk data and analysis into policy and programme design and operations to support interventions throughout the shock cycle from preparedness to response and recovery, to supporting long-term resilience. At the same time, the design of social protection information systems (SPIS), including beneficiary and social registries, should be designed in a way to support better planning and coordination of disaster response, targeting of shock-affected populations, post-shock data collection, and longer-term resilience programming and preparedness.

Through a literature review and consultation with experts and practitioners, this report examines the latest evidence and identifies key knowledge gaps related to effective data and information systems for ASP. The study addresses two broad research questions related to data and information systems for ASP:

- ▶ To what extent is disaster and climate risk, early warning, and post-shock needs data and analysis integrated into social protection policy, planning, and preparedness, and what enables or constrains this?
- ▶ What are the characteristics of registries and data systems that support effective delivery of social protection in fragile and humanitarian contexts?

1 “Adaptive” social protection refers to social protection systems (including governance) or programmes that have been *intentionally* designed or modified to ensure service continuity, scale-up, or support household resilience in fragile or shock-affected contexts. Social protection systems that have not been designed in this way may nevertheless have impacts on household resilience. In this paper, “adaptive” is synonymous with the term “shock-responsive”.

The literature review encompassed both peer-reviewed and grey literature pertinent to data and information systems for ASP published within the last decade. The search strategy entailed a database search of Google Scholar employing various relevant search terms, a snowballing technique based on references within the identified literature, and a targeted exploration of the websites of institutions active in the ASP domain.² Additionally, in-depth interviews were conducted with 15 expert informants from major international agencies, donors, and research institutes. Furthermore, an online survey was administered to UNICEF personnel regarding priority research areas for ASP, yielding seventy-five responses.

The findings of this report are relevant to policy makers, practitioners, and researchers working in the ASP space and will help to inform the future research agenda of the Adaptive Social Protection: Evidence for Child Outcomes (ASPECT) research programme.

The remainder of the report is structured as follows. Section 2 examines the integration of disaster and climate risk, vulnerability, and impact data into social protection design and operations with a focus on design and planning, early warning systems, and post-disaster needs assessments. Section 3 looks at the role of social protection information systems (SPIS) for ASP with a focus on assessing data quality and institutionalising adaptation into SPIS. Section 4 concludes with a summary and areas for future research.

2 Search terms included: “adaptive social protection”, “shock-responsive social protection”, “social protection” in fragile and conflict contexts, “social protection” and climate change adaptation, “social protection” and disaster risk management, “social protection” and resilience, “social protection” and data, registries, and information systems. Targeted website searches included: IDS – BASIC, ODI, OPM, SPACE, UNICEF Innocenti, UNICEF Evaluation Database, World Bank, WFP.

2. Integrating Disaster and Climate Risk and Vulnerability Data into ASP Design and Operations

Numerous policy and guidance documents in the ASP literature highlight the necessity of integrating disaster and climate risk analysis into social protection laws, policies, and programme design and implementation (see, for example, O'Brien, 2018a; TRANSFORM, 2020; Barca *et al.*, 2020; UNICEF, 2019; Bowen *et al.*, 2020). There are several ways in which disaster and climate risk data can inform social protection throughout the shock cycle:

- ▶ Programme design and planning, including targeting, benefit structures, and adaptive measures for shock response, to support household preparedness, coping, and adaptation.
- ▶ Utilisation of early warning systems to prompt the expansion of social protection in response to, or anticipation of, covariate shocks.
- ▶ Conducting post-disaster assessments to guide the social protection sector's response and recovery efforts.

This section investigates the available evidence and gaps in knowledge regarding each of these areas in turn.



2.1 Disaster and climate risk and vulnerability analysis for ASP design and planning

Key Takeaways: The evidence underscores the importance of integrating disaster and climate risk data into social protection design, planning, and implementation to support preparedness and programming throughout the shock-cycle. However, significant barriers exist, including the lack of mutual understanding across historically separate sectors and the technical complexity of producing and analysing risk data including from disaster risk information systems (DRIS). Moreover, data gaps persist, particularly in conflict settings and regarding longer-term climate impacts and gender considerations. There are also several gaps in the literature in relation to:

- ⇒ Practical guidance on how to integrate risk data into policy and design including overcoming sectoral divides and other barriers to integration.
- ⇒ Data and evidence on the longer-term impacts of climate change on livelihoods and how this can inform social protection design.
- ⇒ The practical application of emerging tools for generating disaster and climate risk data and analysis and their use within social protection systems.

Informed policy decisions about disaster risk require developing an understanding of risk, including its root causes and drivers about climate and disaster risk. This entails gathering both historical disaster information and disaster risk information - encompassing hazards, exposure, vulnerability, and capacities - to comprehend past occurrences and anticipate future risks (CADRI, 2020).

Data on disaster and climate risk are pertinent for informing ASP approaches across the disaster cycle, including prevention, preparedness, response, recovery, and financing.

Bowen *et al.* (2020) highlight the primary challenge facing ASP regarding data and analysis. On the one hand, disaster risk management (DRM) traditionally concentrates on disaster hazards and their impacts on assets and physical infrastructure; on the other, the social protection sector focuses on poverty, vulnerability, and idiosyncratic risk for needs assessments and targeting. The literature suggests that social protection actors need to enhance their understanding and utilization of disaster and climate risk and vulnerability data and analysis to inform programme design. This necessitates a multisectoral approach, involving humanitarian actors, to share and integrate idiosyncratic and covariate risk and vulnerability data and analysis for a comprehensive perspective (Bowen *et al.*, 2020; Longhurst *et al.*, 2020). Practitioner survey respondents commonly expressed the need for more practical support in integrating disaster and climate data and analysis into social protection policy and design.

Data sources and examples of integration

One of the primary sources of data on disaster and climate risk originates from disaster risk information systems (DRIS) or disaster management information systems (DMIS). Traditionally, DRM actors have prioritised tools like hazard maps for planning and preparedness (O'Brien *et al.*, 2018). However, the collection and analysis of disaster and climate risk data have evolved, with an increasing number of integrated information systems combining hazard data (hydro-meteorological, geological, biological, etc.) and vulnerability data (people, infrastructure, livelihoods). These systems support planners in understanding risk vulnerabilities and producing impact-based assessments and warning information (CADRI, 2020).

CADRI (2020) highlights several instances of best practice in national DRIS. For instance, Afghanistan's National Disaster Management Information System (NDMIS), a web-based platform primarily focused on preparation and response, collects quantitative and qualitative information on disaster events to analyse impacts, identify vulnerability hotspots, and develop contingency plans. Similarly, Peru's *Sistema de Información para la Gestión del Riesgo de Desastres* (SIGRID) is a web-based geospatial platform designed to query, visualise, share, analyse, and monitor information related to hazards, vulnerabilities, and risks, serving as a cornerstone of the national disaster risk management system.

There are a few examples of integrating disaster and climate risk data into social protection systems. For instance, Solórzano and Cárdenes (2019) highlight the use of disaster and climate risk mapping to inform social protection targeting in Mali, and the integration of a climate lens into the social protection monitoring and evaluation system in Jamaica. Additionally, Bowen *et al.* (2020) note that the World Bank-supported Sahel Adaptive Social Protection programme, spanning Burkina Faso, Chad, Mauritania, Niger, and Senegal, utilised weather data as an objective measure of shocks to analyse the impacts on poverty and identify populations most vulnerable to climatic shocks. However, there is limited detailed analysis in the literature regarding the methods and mechanisms used to implement these integrated approaches or their effectiveness.

Barriers to integration

Current evidence suggests that the utilisation of disaster and climate data from DRIS systems to inform social protection policy, planning, and design remains limited. Sett *et al.* (2022) point out that while various sectoral risk assessment tools exist, integrated risk assessment methods across sectors remain inadequate within the context of ASP. Recent studies conducted in Southern African and South Asian countries indicate that the constrained use of disaster and climate risk data and analysis in ASP stems from the weakness of DRIS and the lack of data relevance across sectors (Bowen *et al.*, 2022; Johnson & Walker, 2023). Several underlying reasons contribute to this issue:

- ▶ Risk analyses often rely on static household vulnerability assessments that may not align with the units of analysis utilised in social protection information systems.
- ▶ Household income and expenditure surveys, typically employed by social protection actors, frequently lack “shock” modules, although there are increasing instances of their inclusion.
- ▶ DRIS data often have limited relevance to social protection actors due to outdated disaster risk assessments, limited accessibility of national Early Warning Systems (EWS) and meteorological data to social protection actors, and the limited range of shocks for which data are collected.

Moreover, in conflict settings, inadequate attention is given to data needs necessary to support conflict-sensitive analysis and practice. This includes evidence on intersecting inequalities, vulnerabilities, and displacement (Tebaldi, 2019; Birch *et al.*, 2023).

Another major challenge in integrating climate and disaster risk information into social protection systems relates to the sectoral divide. Producing and analysing disaster and climate risk data for ASP is a technical and sometimes complex process that requires the collaboration of different disciplines. Solórzano and Cárdenes (2019) highlight the lack of mutual understanding among actors from historically separate sectors and the insufficient availability of data for risk analysis. Moreover, there is typically a low level of capacity for analysis and policy development in lower-income countries, which is compounded by the heightened challenge of working across sectors (Beazley & Williams, 2021). Daron *et al.* (2020) show that attempts to integrate climate forecast data into early warning systems for the Sahel ASP programme faced several challenges (discussed in the next section). Engaging in this process demonstrated that promoting dialogue between social protection and climate stakeholders is valuable, but deeper and more sustained dialogue was required to bridge disciplines, priorities, and agendas to enable ASP systems to integrate climate forecasts.

Longer-term climate impacts

Several studies also note that inadequate attention is paid to the longer-term impacts of climate change and other shocks on livelihoods, which hinders social protection systems from effectively supporting adaptation outcomes and avoiding inadvertently promoting maladaptation, such as causing people to remain in areas that will become unviable in the medium to long term (Costella & Ivaschenko, 2015; Solórzano & Cárdenes, 2019; Daron *et al.* 2020). Solórzano and Cárdenes (2019) highlight the potential of WFP’s Consolidated Livelihoods Exercise for Analysing Resilience (CLEAR) analysis, a methodology to better understand how food security is affected by climate risks, whether related to extreme

events or to long-term gradual changes such as shifting rainfall patterns, rising temperatures, or sea level rise. Nevertheless, several expert respondents expressed concern about the inadequacy of data on the effects of climate change, especially regarding impacts on migration, highlighting the need for more sustained funding and investment in climate and livelihoods research, data, and services relevant to ASP.

Gender

Another aspect requiring further attention is the integration of gender into risk and vulnerability assessments for ASP (Holmes 2019, Perezniето and Holmes 2023). For instance, the gender handbook for humanitarian action (IASC, 2017) suggests that emergency preparedness activities include summaries of key gender issues and statistics to understand the diverse needs during a crisis, as well as pre-existing gender inequalities and their impact on crisis response. Perezniето and Holmes (2019) propose the development of information systems to capture crucial gender-related data to support implementation in crises. This could entail individual-level data (not just household-level data), information on care responsibilities and time use, access to services (health, family planning, pregnancy, child protection), mobility, and security risks.

New and emerging tools

Finally, new and emerging tools and analytical approaches may offer solutions for better integration of disaster and climate risk into social protection, moving beyond the traditional focus of DRM sectors on infrastructure and asset losses. These include innovative approaches to measuring household resilience to shocks and the impacts of shocks on socioeconomic well-being and social protection systems (see Box 1). While these new tools and approaches provide analyses more relevant to ASP, there is yet no evidence that they have been applied in practice or institutionalised within either DRM or social protection systems.

Box 1. New Analytical Approaches to Inform ASP Programming

Hallegatte *et al.* (2017) demonstrate the use of an analytical approach that measures socioeconomic resilience as a function of asset and well-being losses, to provide a stronger evidence base for decision-making around resource allocations between reconstruction and social protection following disasters and to strengthen the case for social protection approaches that promote resilience in the longer term.

Sett *et al.* (2022) show the applicability of a new climate and disaster risk assessment tool for adaptive social protection (CDRAT-ASP). The purpose is to build a data-informed foundation for designing programmes and measures that address layers of risk and are therefore more effective at building resilience. The findings of their analysis, which combines satellite, infrastructure, socioeconomic, and climate disaster data (in this case related to tropical storms), show that the range of potential impacts related to social protection can be very broad and interconnected, with implications for how social protection should be designed. However, while the CDRAT-ASP approach clearly has analytical power, the paper also reveals how complex these methods are in practice, with high data demands and specialised analytical skills.



2.2 Early warning systems (EWS) for ASP response

Key Takeaways: The evidence indicates that Early Warning Systems (EWS) play a crucial role in facilitating rapid and anticipatory responses to climate-induced crises within ASP frameworks by streamlining decision-making, securing financing, and enhancing transparency. However, significant challenges exist, including the need for viable social protection systems, technical limitations in data collection and analysis, and institutional barriers to effective integration. Innovative approaches such as Impact-Based Forecasting (IbF) and the use of Big Data offer potential for more accurate early warning that includes an understanding of how communities and households will be affected but have yet to be integrated into national social protection systems. Several research gaps have been identified, including:

- ⇒ Understanding the technical and political economy barriers to linking EWS to social protection response
- ⇒ Improving the reliability and relevance of climate forecasts for ASP programming.
- ⇒ The barriers to integrating IbF for anticipatory response into social protection systems.
- ⇒ Risks regarding the use of big data including how individual, proprietary information may be misused in the process of machine learning.

Early warning systems (EWS) constitute a fundamental element of broader Disaster Management Information Systems (DRIS). Ideally, EWS should encompass integrated systems that include hazard monitoring, forecasting and prediction, disaster risk assessment including potential impacts, communications, and preparedness actions (Solórzano and Cárdenes, 2019; Williams and Moreira, 2020).

A significant portion of the literature on ASP suggests that EWS are increasingly vital for rapid and anticipatory responses to climate-induced crises (see Bastagli and Harman, 2015; O'Brien, 2018; Barca, 2019; Bowen *et al.*, 2020; Williams, 2020; Johnson and Walker, 2023). Primarily, integrating EWS into social protection systems can facilitate rapid and even automatic expansion in response to forecastable shocks. Bowen *et al.* (2020) note that EWS can offer several other benefits, including securing financing, enhancing actual and perceived transparency in disaster response decision-making, and mitigating moral hazard and adverse selection risks.

Many crisis-prone countries, particularly those facing climate-related food insecurity, have implemented some form of EWS or rely on international EWS. For instance, the Famine Early Warning System Network (FEWS-NET) integrates climate data, conflict information, and market analysis to issue alerts during crises (visit www.fews.net for details). However, the availability and effectiveness of national EWS vary considerably. Barca *et al.* (2019) highlight that, in the Caribbean, although EWS have been established since the early 2000s, their comprehensiveness, accuracy, and integration into early action processes differ significantly. Additionally, there's limited integration of hazard and risk data with socioeconomic information to estimate potential impacts.

Nevertheless, some EWS and index-based triggers are directly linked to social protection programmes, streamlining decision-making to expand assistance post-shock (Bowen *et al.*, 2020). Examples include the Dominican Republic's Index of Vulnerability to Climatic Shocks (IVACC), which integrates forecast data with the Social Registry to assess household vulnerability scores. Similarly, Uganda's Normalised Difference Vegetation Index (NDVI) combines satellite data to inform early response triggers for drought, while Kenya's Vegetation Condition Index (VCI) is linked to the Hunger Safety Net Programme (HSNP)

(see Box 2). Another illustration is the United Kingdom's Cold Weather Payments, targeting households already receiving certain state benefits when temperatures remain at or below zero degrees Celsius for seven consecutive days.³

Box 2. Kenya's Hunger Safety Net Programme Early Warning System

Kenya's Hunger Safety Net Programme (HSNP) features an integrated mechanism for responding to seasonal drought, directly tapping into the National Drought Emergency Fund for scale-up. Additional financing is activated based on an EWS that utilises the Vegetation Condition Index (VCI) to pinpoint regions experiencing drought conditions. The National Disaster Management Authority (NDMA) assesses drought status using the VCI, and HSNP coverage is adjusted in accordance with the severity of the drought (moderate, severe, or extreme). This approach has enabled the HSNP to significantly reduce the time between drought declaration and the delivery of emergency payments, from up to 3 months down to just 10 days (Farhat *et al.*, 2017).

Impact-based forecasting (IbF) is a more recent approach developed by the International Committee of the Red Cross (ICRC) for supporting early action in response to climate-related shocks (Sengupta and Bailey 2022). IbF utilises climate and weather forecast data, combined with socioeconomic data, to predict impacts on populations and release funds for interventions ahead of extreme weather events. Drawing on experiences from several pilot initiatives, Sengupta and Bailey (2022) note that IbF requires several integrated elements, including acquiring and analysing reliable historical data to identify the range of possible impacts and their likely intensity based on hazard type; establishing dedicated teams who can use regular forecast data and combine it with vulnerability information to identify at-risk areas for early action; training, simulations, and pilots to build trust, confidence, and learning; and collaboration between DRM agencies, national meteorological and hydrological services. However, while IbF has had some success in pilots implemented by humanitarian agencies, it has not yet been linked to national social protection programmes or systems.

Big data is also being utilised to support early warning by employing machine learning to predict famine and mobilise early funding. Bowen *et al.* (2020) highlight the World Bank's new partnership with the United Nations, the Red Cross, Microsoft, Google, and Amazon on the Famine Action Mechanism. The authors note that the potential applications for this technology are promising, especially in resource-constrained environments where censuses and household surveys are rare. However, there are concerns related to privacy and how individual, proprietary information can be misused in the process of machine learning.

3 See [Cold Weather Payment](#), UK Government (accessed 21st April 2024).

Emerging best practices

Some literature has identified best practices in the use of EWS and index-based triggers for social protection response. Bowen *et al.* (2020) note that indexes should be easily measured, objective, transparent, independently verifiable, and available in a timely manner. Bastagli and Harman (2015) find that the number of indicators and data requirements underlying the trigger mechanisms affects timeliness; fewer indicators are quicker because it is hard to coordinate data from multiple sources and agencies. However, more complex mechanisms can provide greater accuracy in predicting need. Moreover, there is a trade-off between administrative simplicity that results in higher levels of aggregation, and the risk of missing more localised shocks. A trigger's effectiveness also depends on the correlation between the index and the household's needs (Bowen *et al.* 2020). For example, some indicators allow for anticipatory response (e.g. drought phase indicators) while others only allow for ex-post response (e.g., livestock death, crop yields) (Bastagli and Harman 2015). However, the selection of indicators will depend both on the available data and the overall objectives.

Critically, the timeliness, effectiveness, and efficiency of EWS and index-based triggers will also rely on the level of automation in data collection and on the wider system of response including effective contingency planning and operational procedures once a response is triggered, and the level of coverage and flexibility in targeting of the social protection programme (ibid).

Limitations and challenges

Although EWS are common, linking these to ASP programming is still limited. The literature suggests that there are a range of technical and institutional challenges to effective linking of EWS to social protection systems in practice.

- ▶ First and foremost, for EWS to trigger a social protection response, there needs to be a viable social protection system in place. Many countries still have nascent, highly fragmented social protection systems with low coverage, or they lack the capacity and flexibility to form part of the national disaster response system (Johnson and Walker, 2023; Daron *et al.*, 2020).
- ▶ Second, EWS may focus on a limited set of hazards or types of data. In South Africa, for example, the national EWS focuses on weather and fire events but does not consider household exposure and vulnerability (Bowen *et al.*, 2022).
- ▶ Third, technical challenges also exist. Drawing on experiences from ASP programmes in the Sahel, Daron *et al.* (2020) show that climate forecasts may not be suitable where the information is not yet reliable or relevant (for example, where forecasts hedge towards averages rather than extremes), when frequency and timing or forecast data does not match with other early warning data such as satellite-based and food security indicators, and when forecast data is not adequately linked to their potential impacts.
- ▶ Fourth, a further challenge in using probabilistic climate forecasts is that they require triggers based on probability thresholds, which carries the risk of acting in vain (Daron *et al.*, 2020). Policymakers may be reluctant to establish a system that risks wasting resources. This can be a particular challenge when combined with other political and institutional barriers such as inter-ministerial competition over who owns specific disaster risks and the associated budgets, unclear roles and responsibilities, and limited technical capacities for analysis and development of response strategies (Bowen *et al.*, 2022; Mathers, 2024a).

These challenges suggest that further research would be helpful into both the technical and political economy barriers to establishing effective EWS at national levels that are linked to social protection systems.



2.3 Post disaster assessments

Key Takeaways: Post-Disaster Impact Assessments (PDIA) and Post-Disaster Household Assessments (PDHAs) are crucial for understanding and addressing the impacts of disasters on social protection systems and planning and implementing disaster responses through social protection. While some countries have sophisticated assessment tools integrated into their disaster risk management systems, standardisation, and institutionalisation of PDHAs vary greatly, contributing to a lack of guidance and inconsistency in quality. Key knowledge gaps include:

- ⇒ How approaches to PDHAs can be better standardised, especially in how they are integrated with social protection systems, considering relevance for different types of shocks.
- ⇒ Guidance on the optimal balance between speed and comprehensive data collection within different contexts and data collection systems.

The third core element of DRIS relates to Post-Disaster Impact Assessments (PDIA). There are several types of PDIA, including an initial situation overview, typically conducted within hours of a major disaster; a post-disaster needs assessment (PDNA) (previously known as ‘damage and loss assessments’), sector-level assessments to estimate fiscal impacts, damage to physical assets and livelihoods, and recovery actions and costs; and post-disaster household assessments (PDHA) for evaluating household-level impacts and needs and targeting assistance (Williams 2020).

The PDNA for Employment, Livelihoods, and Social Protection (ELSP) combines secondary macro-level data with rapid primary data collection within affected communities. The purpose is to generate a credible and well-justified picture of the current and likely disaster impact on ELSP-related needs of affected populations (GFDRR *et al.* 2017). However, the PDNA is not a comprehensive household-level assessment (Williams 2020). Moreover, the guidance available for ELSP PDNA, while recognizing the need to consider the impacts of disasters on institutional capacities, provides little guidance on how to do this, and there is limited evidence in the literature regarding post-disaster assessment of social protection systems.

Pre-shock social protection data cannot fully identify post-shock needs, so existing social protection beneficiaries and social registries will not fully overlap with affected populations (Bowen *et al.* 2020). Even where pre-positioned data can facilitate a horizontal expansion of social protection, complementary post-disaster household-level data will be needed. Williams (2020) shows that there is no standardized approach to PDHA, and their institutionalization varies greatly (see Box 3). This likely contributes to the need expressed by practitioner survey respondents for more guidance how to improve the quality of PDHAs for social protection.

Box 3. Varying Degrees of Maturity in PDHA Capability

Chile's Basic Emergency Sheet (Ficha Básica de Emergencia - FIBE) is part of a sophisticated disaster risk management system that includes early warning and has strong legal foundations. The assessment tool is in digital format, geo-referenced, and is linked to the social registry to allow cross-checking and validation of data (Williams 2020, Williams and Moreira 2020). In the Philippines, despite having a well-established DRM system, the Disaster Assistance Family Access Card is still a paper-based tool. The Dominican Republic did not have PDHA capacity in place prior to Hurricane Maria in 2017 and was required to develop a PDHA tool from scratch (Bowen *et al.* 2020, Williams 2020).

Nevertheless, as demonstrated by Chile's FIBE (Box 3), PDHA data can be integrated into social protection and social registries, with the potential for use by both government and humanitarian organisations to inform their responses by expanding or complementing social protection systems (Barca and Beazley, 2019; Bowen *et al.*, 2020). Barca and Beazley (2019) highlight that this necessitates preparatory efforts to identify the required information for social protection, adapt data collection tools accordingly, and ensure the sharing of registries, along with the necessary data and IT infrastructure.

Social protection information systems (SPIS), including social registries, discussed in detail in the next section, can also aid post-disaster assessments in various ways. Firstly, social protection and social registry data can contribute to PDNAs by reducing the amount of data required to be collected (Bowen *et al.*, 2020; Barca and Beazley, 2019). For instance, data from the Philippines' *Listahanan* database and Chile's Registro Social have supplemented post-disaster data collection efforts. Secondly, PDHAs can leverage SPIS systems and infrastructure, potentially enhancing the timeliness and efficiency of data collection (Barca and Beazley, 2019; Johnson and Walker, 2023). For example, in Chile, the Ministry of Social Development (MSD), rather than the ministry responsible for disaster management, oversees FIBE, the Basic Emergency Sheet, due to MSD's expertise and capacity in social registry data collection. Similarly, SPIS have facilitated post-disaster assessments and registration in Ecuador, Ethiopia, Mali, Mexico, Pakistan, and Türkiye, indicating a significant reservoir of experience to establish best practices.

The literature reveals several challenges in the use of PDAs for ASP programming. Drawing on experiences from South Asian countries, Johnson and Walker (2023) note that there is often a lack of advance planning and budgeting for post-shock data collection. One expert informant also noted that there are typically too many actors and sectors involved in post-disaster assessment, and there is an urgent need to reduce fragmentation and harmonise PDNA data collection. Williams (2020) highlights that data collection tools are not always relevant to all types of shocks, reliance on paper-based systems tends to be inefficient and causes delays, and most PDHAs are not integrated or interoperable with social or beneficiary registries or harmonised with standard household surveys, limiting the ability for more integrated analysis. A major challenge that both social protection and disaster management actors face is striking the right balance between speed and collecting sufficient data to inform a comprehensive response.

Finally, Williams (2020) offers several approaches that have proven effective in enhancing the relevance of PDHAs for ASP. This starts with ensuring that PDHA processes are based in legislation and that institutional arrangements allow for a coordinated approach between multiple agencies. On the more technical side, PDHA instruments should be supported by information systems and include offline capacity and should be interoperable with other SPIS, with the necessary data sharing arrangements and protections in place.

3. Social Protection Information Systems for Adaptive Social Protection

The past few years have witnessed a surge in attention paid to the role of SPIS and social registries within the ASP agenda (Barca and O'Brien 2017, Barca and Beazley 2019, Schnitzer 2019, Gelb and Mukherjee 2020, Barca and Hebbar 2020, Goodman *et al.* 2020, Schoemaker 2020, Williams and Moreira 2020, Barca *et al.* 2023, Barca 2023).

This section examines what is known about the use of SPIS for ASP, focusing on how SPIS have been utilised in ASP, the characteristics of and challenges in producing quality data, and best practices in strengthening the adaptiveness of SPIS.



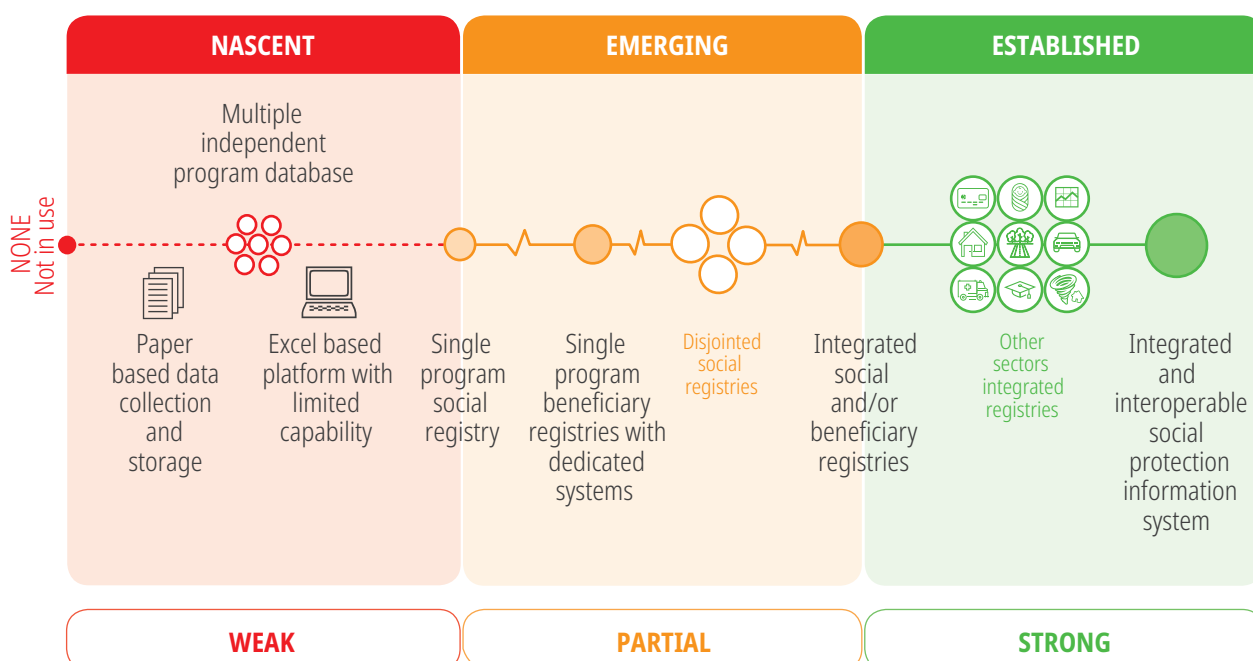
3.1 The role of SPIS in ASP programming

Key Takeaways: The evidence shows that social protection information systems (SPIS) play a crucial role in managing the outreach, intake, registration, eligibility determination, and delivery of social protection programmes. SPIS can vary significantly in their level of maturity, ranging from highly underdeveloped to highly sophisticated, with implications for the system's ability to support rapid and large-scale expansion in response to shocks. Nevertheless, SPIS have been shown to support disaster response in several ways including targeting, post-disaster data collection, planning and coordination, and design of resilience programmes, and have played a crucial role in facilitating national responses to large-scale shocks in certain countries and contexts.

SPIS play a crucial role in managing the outreach, intake, registration, eligibility determination, and delivery of social protection programmes (Bowen *et al.* 2020). SPIS consist of data, information, ICT infrastructure software, database management systems, and institutional arrangements, including policies, organisational structures, and human resources (Leite *et al.*, 2017). Williams and Moreira (2020) identify three main types of registry approaches within SPIS:

- ▶ social registries containing data on both programme beneficiaries and non-beneficiaries (or potential beneficiaries);
- ▶ beneficiary registries containing data solely on programme beneficiaries; and
- ▶ integrated SPIS with registries linked to other data systems such as other beneficiary registries, civil registration, and national ID systems.

SPIS can vary significantly in their level of maturity, ranging from highly underdeveloped to highly sophisticated (Williams and Moreira, 2020; Bowen *et al.*, 2022). Figure 1 illustrates the characteristics of SPIS associated with three levels of maturity: nascent, emerging, and mature.

Figure 1. Levels of maturity in Social Protection Information Systems (SPIS)

Source: Williams and Moreira (2020).

The level of maturity of a SPIS has implications for the system's ability to support rapid and large-scale expansion in response to shocks. These implications are discussed in more detail in the following sections.

The existence and coverage of social registries vary greatly around the world. Williams and Moreira (2020) show that this can range from as low as 3% of the population in Mali's Registre Social Unifié (RSU) to as high as 87% in Pakistan's National Socio-Economic Registry (NSER). The data indicate that both on-demand systems and mass registration or census-type systems are common, but currently, mass registration approaches are still more likely to achieve higher coverage.

ASP design and operations can draw on various types of SPIS data, including basic household and individual-level data, comprehensive socioeconomic data, operational data such as telephone numbers, geo-referenced data, and increasingly, data capturing indicators of shock vulnerability (Barca and Beazley 2019). Depending on the type and quality of data available (discussed in more detail shortly), the literature highlights four main ways in which SPIS can support disaster response (Barca 2017, O'Brien *et al.* 2018; UNICEF 2020).

- ▶ First, targeting of disaster assistance can utilise an existing registry to direct assistance to households and individuals affected by a shock, provided that the "registry" population overlaps with the "disaster-affected" population. This can be achieved through vertical expansion by providing additional top-up payments or services to existing programme beneficiaries, horizontal expansion by extending benefits or services to new caseloads already registered in the social registry, or "piggybacking" by using the registry to implement a new emergency programme for either population.

- ▶ Second, post-disaster data collection, such as post-disaster household assessments (PDHA) led by disaster management actors, can leverage SPIS infrastructure and institutional capacity. This supports needs assessment, identification, and registration of households for other forms of emergency assistance (discussed in Section 2.3).
- ▶ Third, disaster response planning and coordination benefit from registry data, aiding in planning, budgeting, and coordination by estimating caseloads, complementing PDHA data, and allowing external humanitarian actors to align and harmonise their assistance to minimise exclusion and avoid duplication (O'Brien *et al.* 2018).
- ▶ Fourth, resilience programming and preparedness can utilise SPIS data prior to shocks to inform risk analysis and vulnerability assessment for planning, preparedness, and development of longer-term measures to support household resilience and disaster preparedness planning, especially when it includes geo-referenced data combined with DRIS data on hazard risk (Williams and Moreira 2020) (see also Section 2.1).

The literature indicates that SPIS have played a crucial role in facilitating national responses to large-scale shocks in certain countries and contexts. In a pre-COVID pandemic analysis, O'Brien *et al.* (2018) note that SPIS have enhanced the efficiency of disaster response by averting duplication and improving timeliness, coverage, and predictability.

Evidence from national responses to the COVID-19 pandemic suggests that SPIS and social registries have contributed to more prompt responses, although this is contingent on existing coverage levels and other factors (Beazley *et al.*, 2021c; Lowe *et al.*, 2021; Coll-Black *et al.*, 2023; Costella *et al.*, 2023). A review of fifty-three pandemic responses in LMICs indicated that the mere existence of a social registry was not strongly linked to swifter implementation, particularly horizontal expansion (Beazley *et al.*, 2021c). This was largely due to low social registry coverage and outdated data. However, where coverage exceeded 15% of the population, responses were expedited, especially when social registries were interoperable with other data systems, data were amalgamated with administrative data and on-demand registration, there was capacity to implement various payment modalities, and existing mechanisms for outreach, grievance redressal, and monitoring were in place (Beazley *et al.*, 2021c; Lowe *et al.*, 2021). Additionally, there are indications that utilising SPIS to bolster disaster response may also reduce costs compared to alternative approaches, although evidence supporting this claim is limited (O'Brien *et al.*, 2018). Further research in this domain would be valuable to strengthen the rationale for investing in more adaptive SPIS.

Other analyses of pandemic responses indicate that SPIS are more adept at supporting vertical rather than horizontal expansion of social protection (Coll-Black *et al.* 2023, Costella *et al.* 2023). In Eastern Europe, it was observed that increases in social assistance predominantly benefited existing beneficiaries of various programmes, while new programmes were introduced based on information stored within tax authorities or other ministries (Coll-Black *et al.* 2023). Similarly, in Latin America and the Caribbean, it was noted that even in cases where social registry coverage was extensive, supplementary data sources were necessary to address gaps in coverage, often through other administrative data and mass registration efforts (Costella *et al.* 2023). Although vertical expansion may appear straightforward, evidence suggests that preparatory measures can significantly enhance the timeliness of the response (Barca and Beazley 2019). Horizontal expansion and piggy-backing programmes onto social registries typically entail greater complexity and necessitate substantial planning and investment in preparedness (*ibid.*).

The evidence indicates that, despite the challenges with and limitations of social registries, their presence is a crucial foundation for ASP. However, some expert informants have expressed concerns about the assumption that simply having a social registry in place is sufficient to identify and reach individuals affected by covariate shocks – when in fact even the most advanced systems have limitations – and whether digital systems inevitably represent an improvement over in-person approaches to registration. There may be value in conducting comparative research on different approaches to managing data for ASP, particularly in fragile and conflict-affected contexts.



3.2 Assessing SPIS for ASP programming

Key Takeaways: The literature on data relevance and quality highlights that even where Social Protection Information Systems (SPIS) have high coverage, various factors such as incomplete data, relevance of variables, currency, accessibility, and accuracy may impede their suitability for disaster response and resilience programming. Furthermore, social registries may lack up-to-date information and face challenges in accessibility and accuracy. Further research is needed in several areas, including:

- ⇒ Understanding optimal variables related to disaster risk and resilience that should be integrated into SPIS
- ⇒ Trade-offs between data relevancy and collection costs, and best practices for producing current and timely SPIS data for disaster response
- ⇒ Extending SPIS coverage to hard-to-reach areas and excluded populations, such as migrants.

Even where beneficiary and social registry coverage is high within geographic areas that experience covariate shocks, the literature points to several reasons why the data may not be fit for purpose for disaster response and resilience programming (Barca and Beazley, 2019). Key factors affecting the quality of SPIS data for disaster response include coverage, whose data and what data have been collected and stored, how the data are collected and updated, who is responsible, the extent of integration with other information systems, and the nature of processes and protocols for data sharing (ibid.). The common framework used in the literature for assessing the quality and relevance of data and SPIS for ASP programming identifies five key dimensions: completeness, relevance, currency, accessibility, and accuracy (Barca and O'Brien, 2017). Each of these is briefly discussed here in turn.⁴

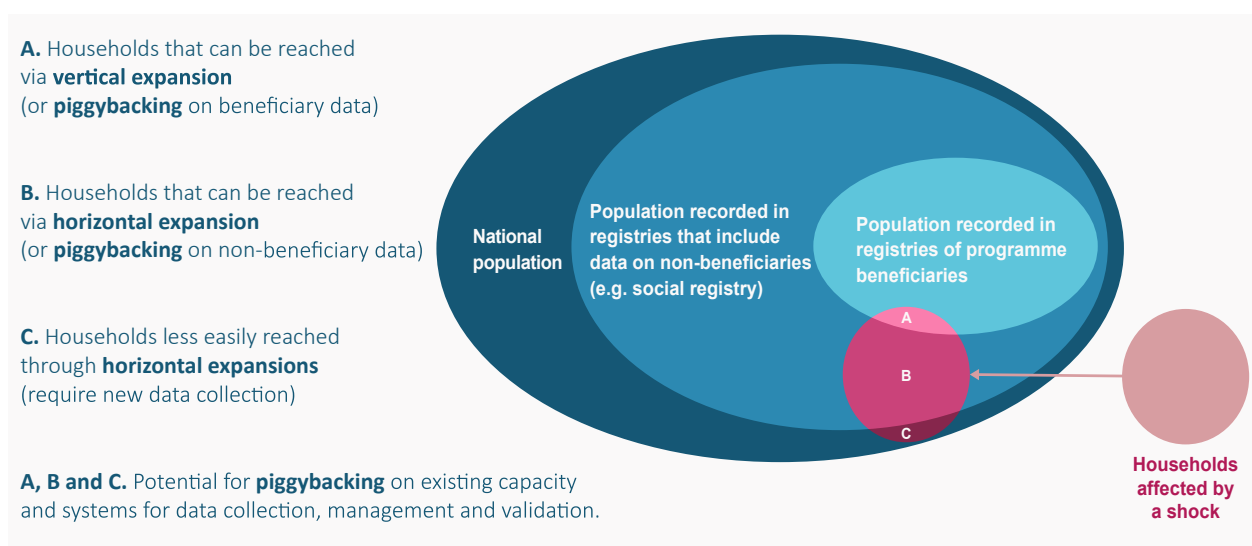
3.2.1 Completeness

Completeness of SPIS data refers to the number of available records within the existing registry or registries compared to the population in need in a disaster-affected area. Barca and O'Brien (2017) show that the extent to which SPIS and the associated registries can support disaster response depends on the overlap between the beneficiary data and registered non-beneficiaries, and the affected population (see Figure 2). Existing beneficiaries that overlap with the affected population (area A in Figure 2) can be assisted through vertical expansion of programme benefits or piggybacking on beneficiary data, while registered non-beneficiaries that overlap with the disaster-affected population (area B in Figure 2)

4 The framework used by Barca and O'Brien (2017) draws on a framework proposed by Wang and Strong (1996) and can also be used to assess databases for routine social protection delivery.

can be assisted through horizontal expansion or piggybacking on the social registry. The non-registered population (area C in Figure 2) will need to be identified and registered for horizontal expansion or supported through other means.

Figure 2. Using Social Protection Data for Scale-Up of Assistance in Response to Shocks



Source: Barca and Beazley (2019) drawing on Barca and O'Brien (2017). Note, the sizes of the ovals are arbitrary and will vary widely by country.

One of the primary factors influencing the completeness of **existing beneficiary data** for disaster response is the programme design and associated targeting approach (Barca and Beazley, 2019). Social protection programmes typically employ targeting approaches that only partially align with disaster and climate exposure and vulnerability (Barca *et al.*, 2019). Consequently, when increasing assistance solely to existing beneficiaries, a considerable proportion of those affected may not receive support. The degree of alignment depends on various factors, including the type and location of the shock on one hand, and the type or combination of social protection targeting approach on the other, such as geographic, poverty, categorical, community-based, school-based, or any combination thereof (O'Brien *et al.*, 2018). Box 4 provides a more detailed overview of the advantages and disadvantages of data from three of the most common targeting approaches.

Box 4. Pros and Cons of Different Targeting Approaches for the Completeness of Social Protection Registry Data for Responding to Covariate Shocks

Many social assistance programmes in lower-income countries adopt **geographic targeting**, prioritising poorer rural areas. However, this approach risks excluding populations in other regions, particularly urban areas, which may face less frequent but potentially high-impact shocks. Geographic targeting informed by disaster and climate hazard information (see Section 2.1) is more likely to overlap with affected populations. This approach is common in contexts of recurrent food insecurity where social protection programmes are introduced and designed accordingly.

Poverty-targeted social assistance programmes often employ a proxy-means test (PMT) in the absence of income and tax records. However, while chronic poverty and vulnerability to covariate shocks are related, they are not synonymous (Barca and Beazley, 2019). A study of targeting approaches in West Africa by Schnitzer (2018) suggests that PMTs are better at identifying the chronically poor, while the household economy approach (HEA), favoured by food and nutrition actors, is more effective at identifying transient food insecurity. Geographic targeting is particularly efficient in responding to food crises, which tend to be covariate. The authors recommend a combination of approaches for ASP in contexts of recurrent food insecurity. Furthermore, the underlying data required for both PMT and HEA approaches are similar, suggesting that minor adjustments to existing beneficiary and social registries could enhance their ability to identify households vulnerable to seasonal shocks that exacerbate food insecurity (Bowen *et al.*, 2020; Barca *et al.*, 2023).

Categorical targeting approaches, such as child grants or social pensions, may have limited overlap with vulnerable, crisis-affected households (Barca and Beazley, 2019). For instance, following the 2015 earthquakes in Nepal, top-up payments were made to beneficiaries of social assistance schemes for vulnerable people, categorically targeted to children, the elderly, and other groups. Officials noted that social assistance beneficiaries constituted only around 30% of the earthquake-affected population (Merttens *et al.*, 2017). However, Barca and Beazley (2019) suggest that when coverage is high, categorical targeting can be less socially divisive and easier to scale up due to low data requirements.⁵

Registry data on non-beneficiaries can support horizontal expansion of assistance or be used to piggyback emergency programmes. Barca and Beazley (2019) show that registries with the highest coverage, often those that serve multiple social protection programmes or are interoperable with other data systems, have the greatest potential. However, high coverage alone is not sufficient to make the data useful. This will also depend on which targeting approaches are used, the underlying variables that are available, and how the data are used. In a study on the use of SPIS data for assessing multiple vulnerabilities in West Africa, Barca *et al.* (2023) find that humanitarian programmes sometimes achieve sub-optimal coverage when they piggyback on existing beneficiary lists rather than using the data to develop specific targeting or use an entire social registry as a beneficiary list rather than selecting more specific data points. This highlights the need for more strategic use of the data which could be informed by further research into the ways in which this can be done.

⁵ Other targeting methods including self-selection (often used for public works) and community-based targeting will have other implications for reaching disaster affected populations but are not addressed in detail here (see Barca and Beazley 2019).

Even where coverage of social registries is high, parts of the population will always be excluded by design. For example, Malawi's unified beneficiary registry (UBR) covers approximately the poorest 50% of the population in target districts, but large numbers of the population remain uncovered in the case of large-scale shocks (Holmes and Costella, 2017; King and Tranchini, 2017, in Barca and Beazley 2019). Displaced populations are also often not represented in beneficiary or social registries because they are excluded due to legal or policy provisions that restrict registration to certain administrative locations or because non-citizens are ineligible for support. Nevertheless, there are examples of social registries that include non-citizens such as in Iraq, Brazil, Chile, and Colombia (Tabaldi 2019). Practitioner survey respondents highlighted the need to better understand how to extend social registry coverage in hard-to-reach areas and to excluded populations including migrants. Further research could be useful into the conditions that support the inclusion of displaced populations in social registries, including refugees.

3.2.2 Relevance

Relevance of the data pertains to having the appropriate variables and information for the intended purpose. This depends on several factors, including the type of shock and the affected demographics. Barca and Beazley (2019) differentiate between relevance for planning and targeting, and relevance for timely delivery. Planning and targeting in the context of shocks necessitate variables that can aid in predicting which households may require support following a shock. This includes high-quality geographic data, pertinent socioeconomic data, and variables related to disaster and climate risk and vulnerability (discussed in Section 2.1) (Barca et al 2023). However, in practice, the relevant variables for assessing household food availability and needs at the time of a shock are typically not available in social protection registries. Relevant operational data to support timely delivery encompasses bank account details, contact information, ID numbers, geo-location, biometrics, and so forth. However, where these are available, it is often only for a subset of a social registry that is already receiving support (Barca and Beazley 2019).

Moreover, expert informants note that there is an evidence gap regarding the role of SPIS data in resilience programming. The primary focus tends to be on major disasters because they entail more urgency, and the imperative is driven by humanitarian agency agendas. Further research could be valuable in understanding the optimal set of variables required to support diverse types of programmes and the trade-offs between comprehensiveness in terms of data relevancy and the costs of data collection.

3.2.3 Currency

Currency of the data refers to how up to date the information is. This can depend on the approaches to data collection, targeting, and information management, as well as the nature and impact of the shock (Barca and Beazley, 2019). Social registries often consist of highly static beneficiary lists that are only updated every 4-5 years and lack the capacity for dynamic data collection and registration (Bowen *et al.*, 2020; Johnson and Walker, 2023; Barca, 2017; Bastagli and Lowe, 2021). However, to effectively support the objectives of ASP, which are inherently related to changing needs and circumstances, data need to be collected frequently, which is a challenge in low-capacity and dynamic contexts (Bowen *et al.*, 2020). However, the evidence suggests that strong systems make this possible. For example, in Türkiye, social protection was expanded to refugees despite language barriers and additional work for local officials. Currency also affects the operational relevance of data, as addresses, phone numbers, and other key personal data change over time.

3.2.4 Accessibility

Accessibility relates to the ease with which potential users, including both government and non-governmental actors, can obtain the data and is dependent on who the users are and the processes and protocols that are in place. Beazley *et al.* (2021c) note that the broader institutional arrangements may not be fit for purpose, with restrictive mandates for systems and data use and a lack of protocols for data sharing between systems and agencies. Political factors can also limit data access where control of information is linked to decision-making and budgets (Barca and Beazley, 2019). The evidence suggests that data-sharing agreements in the context of ASP are better when relations between actors are built up over time. How data are stored, whether digitally or paper-based, and the institutional capacity of the wider information system are also crucial factors in accessing data.

3.2.5 Accuracy

Finally, accuracy refers to data quality in terms of the precision of the recorded variables. Barca and Beazley (2019) note that there are two perspectives to consider regarding data accuracy. Firstly, technical accuracy, which relates to the quality of data collection, verification, and validation. Secondly, perceived accuracy, concerning the trustworthiness of the institutions responsible for the data. Both aspects need to be considered to ensure data effectively support ASP programming.

Together, these five criteria can assist in assessing the readiness of SPIS to support ASP programming alongside other broader considerations. Barca *et al.* (2023) also highlight that whether and how registries are adapted will depend on the shock context, including predictability, frequency, scale, and likely impacts on populations and the data system itself. Alongside this, Barca and Beazley (2019) note the importance of assessing the benefits, risks, and trade-offs of using existing data versus “starting from scratch”. In other words, data quality along the dimensions considered is relative to the context and the available alternative options (Bowen *et al.* 2020). Among practitioners, there is considerable demand for more evidence of best practice in producing SPIS data that is current and timely for disaster response and how to improve the quality of that data.



3.3 What do more adaptive SPIS look like?

Key Takeaways: The evidence suggests that to effectively utilize SPIS for disaster and climate response, certain key factors need to be addressed. Legal and policy frameworks play a crucial role in establishing the reliability and sustainability of SPIS, while institutional capacity building and preparedness, including operational guidance, are vital to ensure SPIS readiness for diverse actors' involvement in disaster response. Approaches to rapidly expanding registry coverage, such as on-demand registration and post-disaster household assessments, alongside innovative methods utilizing satellite and mobile data, can support more inclusive assistance, but can also come with data protection risks. Ensuring interoperability between SPIS and other sector registries, national ID systems, and humanitarian databases, while prioritizing data protection and privacy, is also crucial for effective ASP programming. The review of evidence also reveals knowledge gaps in several areas, including:

- ⇒ The technical and political economy factors that shape establishment of large-scale information systems that are used by multiple actors, including DRM ministries.
- ⇒ The potential levels of exclusion, especially of marginalised groups, from diverse types of SPIS and social registries when responding to crises.
- ⇒ How humanitarian actors can use, and managing the risk of using, national information systems, especially in contexts where the broader legal frameworks and institutions are weak.
- ⇒ Minimum requirements for data sharing in crisis contexts that ensure transparency and accountability, without being overly restrictive.

Developing SPIS that are well adapted to supporting disaster and climate response and programming requires institutionalising preparatory measures to provide better quality data at the right time, based on a strong policy vision (Barca and Beazley, 2019). This section examines the evidence on what has worked within different elements of SPIS to be more adaptive to disaster and climate risk, including legal frameworks, institutions, approaches to rapidly expanding coverage, interoperability, and data protection.

3.3.1 Legal and policy frameworks

Legal and policy frameworks form a critical foundation for ensuring the reliability and sustainability of SPIS. In a review of approaches to expanding social protection in shock contexts, Mathers *et al.* (2023) show that Cambodia and Nigeria significantly expanded the provision of cash transfers in response to the COVID-19 pandemic. In both countries, a key enabler of the rapid expansion was pre-shock investment in strengthening and expanding the social registry, including through defining its role in legal and policy frameworks.

Evidence suggests that the legal foundations for social registries can be established prior to the development of operational systems, or vice versa. The important factor in developing legislation is to ensure a balance between being insufficient, which may undermine longer-term sustainability, and overly restrictive, which may limit the system's responsiveness to shocks. Barca (2023) outlines the core aspects of legislation for "adaptive" SPIS, including an outline of the overall objectives and vision for the information system (beyond just 'targeting' functions), high-level mandates and institutional housing, and key principles and 'minimum parameters' for its quality and functioning. More detailed operational guidelines and business processes would be defined in supporting documents.

At the policy level, Barca *et al.* (2023) emphasise the importance of making social registries “agnostic” to targeting (i.e., separating/disconnecting targeting approaches from the social registry) to better support different types of programmes that tackle various vulnerabilities. In countries with recurrent food insecurity, this would go some way towards harmonising data systems and programming between social protection and food security actors, which continue to be largely separate. However, while it is important not to associate the registry with one particular targeting approach, one expert informant noted that it is still necessary for the overall policy vision to include the planned and likely targeting approaches of different programmes to define the data structure of the registry.

3.3.2 Institutions, capacities, and preparedness

The literature on data systems for ASP underscores the importance of strengthening institutional capacities and preparedness measures before shocks occur to enhance data quality (Bowen *et al.* 2020; Bastagli and Lowe 2021). Effective oversight and coordination arrangements must be established for SPIS and social registries to accommodate the diverse range of actors, including humanitarian and DRM actors, reflecting the breadth of data requirements for ASP (Barca 2023, Bowen *et al.* 2020). Mali’s Steering Committee for the social registry, with its broad mandate to serve the social protection sector and beyond, comprises representatives from actors addressing vulnerability, food insecurity and malnutrition, the ASP programme, and development and humanitarian partners.

Some expert informants highlighted the importance of a government-wide information system being housed within a robust centralised body that coordinates integration across different ministry data systems. In practice, the ministry or department responsible for managing data systems can vary. For instance, in Peru, the ministry of social development was tasked with developing protocols for data-sharing and interoperability of the DMIS due to its expertise with the social registry (Bastagli and Lowe 2021). The literature also underscores the need to establish management units and processes that facilitate collaboration across sectors and institutions. In Mauritania, for example, a sub-unit was established to focus on data utilisation and how to engage other sectors by demonstrating the added value of the data system and implementing manuals to guide shock response and data protection measures (Barca 2023).

Developing emergency operational guidance is particularly crucial for guiding shock response, including protocols for system disruptions such as off-line functionality, business continuity plans, data back-up, and training (Williams and Moreira 2020). Expert informants emphasise the need to better understand the requisite level of institutional support and human resources necessary to ensure the effective functioning of SPIS in shock contexts, including how to maintain system functionality during shocks.

Schoemaker *et al.* (2020) stress that humanitarian actors also bear responsibility for adopting approaches to data and information systems that foster eco-system development rather than investing in standalone systems. However, the use and implications of using national information systems are generally poorly understood by humanitarian actors, especially in contexts where the broader legal frameworks and institutions are weak.

3.3.3 Approaches to rapidly expanding registry coverage

Ideally, registries will be expanded prior to shocks occurring, using disaster and climate risk data to identify and prioritise regions and populations vulnerable to shocks (see Section 2.1). However, beneficiary and social registries will almost always have incomplete coverage of those in need following major shocks, and it is unrealistic to expect 100% population coverage in most contexts (Barca and O'Brien 2017). There is almost always a need for systems to rapidly register new beneficiaries following shocks (Costella *et al.* 2023, Mathers *et al.* 2023). Common mechanisms include on-demand registration systems and post-disaster household assessments, alongside more innovative approaches that utilise satellite and mobile data. Drawing on registries from other data systems is discussed in the following section on data sharing and interoperability.

First, on-demand registration allows households and individuals to register at any point in time and is crucial for data currency and inclusivity of ASP responses (Barca and Hebbbar 2020). There are different approaches to on-demand registration, including through permanent local office capacity, online via a digital window, and through periodic outreach. Digital platforms have accelerated the use of self-registration systems and helped to phase out infrequent mass registration approaches (Bastagli and Lowe 2021, Lowe *et al.* 2021). Integration of databases can also support verification and updates rather than new registration.

While in theory on-demand systems provide anyone affected by shocks the opportunity to access social protection and emergency assistance, the literature shows that there are often challenges even in middle-income countries, as they tend to be labour intensive and present excessive direct, indirect, and opportunity costs for applicants, leading to low uptake (Barca and Beazley 2019, Coll-Black *et al.* 2023). Bastagli and Lowe (2021) note that, while many emergency responses to the COVID-19 pandemic relied on digital-only registration, little is known about those who were missed out due to digital exclusion or digital illiteracy. For example, exclusion may result from lower levels of awareness and digital access among marginalised populations (Gelb and Mukherjee 2020, Lowe *et al.*, 2021). Digitised administrator-driven approaches also carry risks in terms of potential violations of data privacy and data protection, digital exclusion, bias and discrimination, loss of transparency, spurious correlation and fraud, as well as high set-up costs (see e.g. Ohlenburg 2020; Eubanks 2018 in Bastagli and Lowe 2021).

Given the additional demands placed on on-demand systems in the context of shocks, and the associated risks, there is a need to invest in strengthening systems and preparedness measures. O'Brien *et al.* (2018) highlight the need to adapt registration systems to enhance access following shocks, such as simplifying registration requirements, mobilising local desks, and covering transport costs. Communications and outreach are also critical to ensure people know how to register (Johnson and Walker 2023).

Second, post-disaster household assessments (PDHAs) led by disaster management actors can be used to expand registries, particularly when social registries are interoperable with registries of disaster-affected households. Refer to Section 2.3 for a discussion on how PDHAs can better link to SPIS.

Third, innovative approaches are emerging that utilise non-traditional data sources, such as geo-location, satellite, and mobile data, for remote targeting (Raftree 2021). Software is programmed to identify the poorest regions of a country based on certain physical characteristics revealed by satellite images, and machine learning can identify patterns and construct poverty maps to estimate levels of poverty. Individual households can be identified and assessed for levels of poverty using databases such as tax returns, occupation records, voter registration lists, and/or mobile phone data. For instance, wealthier individuals tend to use their phones differently from poorer individuals, and machine learning can estimate wealth status based on mobile phone data. This approach has been employed by Give Directly in Togo, and the government has expressed interest in using the data to establish a social registry.

While privacy concerns are associated with the use of this data, as well as concerns about the potential exclusion of the most vulnerable individuals who may not have access to mobile phones, there is also evidence suggesting that big data methods can lead to greater inclusion, especially when there are limited alternatives for in-person enrolment (Raftree 2021). Raftree (2021) notes the need to assess the ethics of the approach, including data validity, potential bias and fairness, transparency, explainability, and privacy. Expert informants highlighted the growing potential for technology to support social protection data needs in shock contexts and emphasised the need for further research into the benefits, costs, and potential links between national systems and philanthropic initiatives of data and software companies.

Last, Mathers *et al.* (2023) underscore the importance of integrating specific measures to identify and register vulnerable or excluded groups within disaster contexts, such as persons with disabilities or displaced populations. In Cambodia, for example, the national Disability Identification Mechanism was established following the onset of the COVID-19 pandemic, registering more than 240,000 people in the first-ever national database of persons with disabilities and increasing access to both the COVID-19 cash transfer and other forms of social protection and care programmes. Several expert informants highlighted the need for more research into extending the coverage of social registries into hard-to-reach areas and ensuring that they capture migrants and people on the move.

3.3.4 Interoperability

There is a strong emphasis in the literature on the importance of data sharing and interoperability between information systems to support more effective ASP programming (Beazley *et al.*, 2019; Johnson and Walker, 2023; Barca, 2023). This encompasses interoperability not only between multiple social and beneficiary registries, but also between SPIS and DMIS, other sector information systems, national ID systems, and other service utilities. Expert informants and practitioner survey respondents also frequently highlighted the need to reduce fragmentation and improve interoperability between databases to enhance the timeliness and quality of data for both adaptation and emergency programming.

Experiences of integrated information systems for ASP vary considerably. In many cases, especially in low-income countries, data systems are nascent, and data sharing mechanisms and interoperability functions are absent, often due to a lack of digitisation (Barca, 2023). However, even in countries that have moved towards establishing the digital foundations for individual programmes, the registries are often not integrated to enable a coherent social protection response (Barca *et al.*, 2019; Gelb and Mukherjee, 2020). Expert informants highlighted several reasons for this, including poor-quality databases, a lack of data sharing

protocols, and a lack of harmonisation in the data units employed by different registries. Another common issue raised by expert informants is that different ministries are reluctant to share data due to a lack of trust and a reluctance to cede control over their own data, particularly among more dominant ministries. Given these challenges, Barca (2023) notes the importance of simultaneously enhancing integrated functions across registries and information systems when developing and strengthening beneficiary and social registries.

Nevertheless, there are several examples of more highly developed systems with a greater degree of interoperability from which lessons can be drawn, such as Brazil's Cadastro Único, Pakistan's National Socio-Economic Registry (NSER), and Türkiye's integrated system (see Box 5) (Gelb and Mukherjee, 2020). Further research could focus on these systems to better understand how both the technical and political economy barriers were overcome to establish large-scale information systems that are used by multiple actors.

Box 5. Interoperable SPIS in Türkiye

During the COVID-19 pandemic in Türkiye, the capability to cross-reference various databases using a unique identifier enabled an expansion in the scale and accuracy of targeting social assistance without requiring additional data collection. Before the crisis, Türkiye utilised 28 government databases, encompassing property and vehicle registries, as well as income tax and social insurance records, to ascertain eligibility. This same system was utilised to temporarily extend the pool of eligible cash transfer recipients from 4 to 12 million households (Palacios, R. 2020).

The following considers experiences related to interoperability between SPIS and a range of different information systems and how they can facilitate ASP programming.

Other programme sector data systems

Integrating beneficiary and social registries with other sector registries can allow social protection programmes to extend coverage to other groups when necessary and broaden access to other services for social protection beneficiaries. Coll-Black *et al.* (2023) highlight Armenia's response to the COVID-19 pandemic, where automatic payments were made to workers registered with the tax authority, pregnant women recorded by the Ministry of Health, and students based on enrolment records held by the Ministry of Education.

Mathers *et al.* (2023a) note that integrating social protection with other sectoral programmes and services such as health, nutrition, education, and employment services can be an effective way to meet a more holistic range of needs for specific population groups. Cash programmes in Cambodia and Cabo Verde that were expanded in response to the COVID-19 pandemic used existing integrated social registries, allowing new beneficiaries to also have access to health insurance (in Cambodia) and electricity, water, and housing subsidies (in Cabo Verde).

Humanitarian data systems

Humanitarian actors are also developing more joint operational systems for programme implementation, such as the Lebanon One Unified Inter-Organisational System for E-cards (LOUISE) (see Box 6). However, while this system provided some efficiency gains, it did not promote interoperability in terms of data (Schoemaker *et al.*, 2020). Schoemaker *et al.* (2020) and Longhurst *et al.* (2020) suggest that agencies with proprietary software such as SCOPE, ProGres, PRIMERO, and BRAVE should go further to open these systems to greater interoperability. Some progress has been made in moving towards greater integration between humanitarian and social registries. In Nigeria, for example, the government and development partners have consolidated several registries for IDPs into a single Unified Registry of Beneficiaries (URB) and developed interoperability between the URB and the national social registry, providing a strong platform for more coordinated social protection and humanitarian programming (Mathers *et al.*, 2023).

Box 6. The Lebanon One Unified Inter-Organisational System for E-cards (LOUISE)

In early 2016, UNHCR, WFP, and UNICEF agreed on a common payment card for their respective cash and voucher (CVA) programmes and established the Lebanon One Unified Inter-Organisational System for E-cards (LOUISE). The purpose of LOUISE was to support the design, delivery, and monitoring of cash and voucher assistance. LOUISE's ambitions rapidly evolved from its primary focus on a joint delivery mechanism (i.e., a common card used as an instrument for CVA delivery) to a multi-faceted operational model with collaboration across multiple steps of the project cycle. In 2018, LOUISE members assisted between 148,000 and 282,000 households each month and distributed more than US\$435 million of CVA assistance via the platform (Pelly and Juillard 2020).

Disaster management information systems

SPIS should also aim for greater interoperability with **DMIS**, particularly concerning geo-referenced data, early warning systems, and registries of disaster-affected households (Beazley and Williams, 2021). This is discussed in more detail in section 2.1.

National ID systems

The literature also underscores the importance of linking SPIS to national ID systems, where available, to facilitate cross-verification of data and prevent duplication, thereby enabling quicker expansion of assistance in response to shocks (Gelb and Mukherjee, 2020; Lowe *et al.*, 2021; Johnson and Walker, 2023). During the COVID-19 pandemic, several countries, including South Africa, Namibia, Türkiye, Pakistan, and Brazil were able to screen applications for assistance against multiple criteria using databases linked by a national ID number (Gelb and Mukherjee, 2020). Gelb and Mukherjee (2020) note that digital screening with a national ID has helped reduce opportunities for diversion and corruption in new programmes implemented under extreme time pressure. Lowe *et al.* (2021) mention that in the absence of a formal foundational ID system, alternative approaches such as comprehensive local-level population lists, or a voter ID can be used.

Other services

Finally, integrating SPIS with the information systems of other services can support the operational aspects of ASP programmes and has been crucial in achieving high coverage and timely responses (Costella *et al.*, 2023; Mathers *et al.*, 2023). In the COVID-19 response in the Dominican Republic, the implementation agency for the cash transfer programme accessed the phone numbers of new beneficiaries not previously registered by sending their ID numbers to the Dominican Institute of Telecommunications (Costella *et al.*, 2023).

In conclusion, Barca (2023) emphasises the importance of considering all potential users and uses of the data when developing social registries and SPIS to establish the appropriate interoperability.

3.3.5 Data protection and privacy

Effective data protection within SPIS is crucial from both a human rights perspective and for the efficient functioning of social protection programmes, as well as for coordination and data sharing with other government agencies and non-governmental partners, including humanitarian actors (Barca and Beazley, 2019; Barca *et al.*, 2023; Birch, 2023). It is imperative that ASP and humanitarian responses using existing data systems do not compromise the data security and privacy of registered households. In the worst-case scenarios, data breaches in conflict and politically fragile contexts can lead to the persecution of individuals and entire groups, underscoring the necessity of prioritising data protection in these settings (Birch *et al.*, 2023; Bowen *et al.*, 2020). Indeed, even in cases where national data systems are weak or governments are parties to conflict, humanitarian actors may be unable to share data due to legal restrictions and adherence to humanitarian principles. Additionally, Bowen *et al.* (2020) highlight the heightened risk of data loss and misuse in dynamic situations involving multiple new actors, limited prior experience, rapid decision-making, and a lack of memoranda of understanding (MOUs) and protocols for data management, use, and protection.

The literature on SPIS underscores the significance of having national data protection laws in place. However, Barca (2023) notes that in Sahel countries, although legislation has been enacted, the extent to which data protection provisions are enforced remains unclear, thereby limiting some actors' willingness to share data with government agencies. If overly restrictive, data protection legislation can impede data sharing and the interoperability of information systems (Bowen *et al.*, 2020; Gelb and Mukherjee, 2020). For instance, in the Philippines, data protection laws restricted the use of data from the social registry by external agencies (Bowen *et al.*, 2020). In India, it is not feasible to verify whether someone is receiving a specific benefit. Furthermore, data protection laws should ensure that (potential) beneficiaries can provide fully informed consent during registration. However, Gelb and Mukherjee (2020) raise concerns that individuals living in poverty may have limited power to decline or control how their data are utilised. Several practitioner survey respondents highlighted the need for better guidance on the minimum requirements for data sharing, including between government and private sector databases, and how to navigate the risks and potential of overly restrictive data sharing protocols.

Schoemaker *et al.* (2020) emphasise several broad principles regarding interoperability between information systems and data protection, including considering the wider implications of data sharing related to data control, access, management, and editorial permissions. They also highlight the legal, technical, ethical, and programmatic risks associated with connecting data systems and stress the importance of accepting the inevitability of data breaches, especially as more data is collected and centralised, and of implementing robust mitigation measures. Barca and Beazley (2019) note some emerging good practices related to data collection and protection, such as ensuring free, informed consent for specific purposes, collecting only the necessary minimum data, establishing data protection protocols for storage, transmission, and use, maintaining transparency, and providing data subjects with access to grievance and redress mechanisms. Best practices for ensuring data protection in social protection have been consolidated in various resources, including the inter-agency “Implementation Guide – Good Practices for Ensuring Data Protection and Privacy in Social Protection Systems” (Ferro, Wagner, and Stein-Kaempf, 2024). Nevertheless, practitioner survey respondents expressed the need for a better understanding of transparency and accountability in relation to access of SPIS data.

4. Conclusions and the Future Research Agenda

This report has explored the latest evidence and expert and practitioner insights into approaches, drivers, and bottlenecks to effective data and information systems for ASP. The following summarises the findings regarding what is known about each aspect of data and information systems for ASP, the key gaps in knowledge, and potential questions that could form a future research agenda.

Disaster and climate risk and vulnerability analysis for ASP design and planning

The evidence underscores the importance of integrating disaster and climate risk data into ASP planning, design, and implementation to support preparedness and programming throughout the shock-cycle. The literature also emphasizes the need for a multisectoral approach, and the involvement of humanitarian actors. However, significant barriers exist, including the lack of mutual understanding across historically separate sectors and the technical complexity of producing and analysing risk data including from disaster risk information systems (DRIS). Moreover, data gaps persist, particularly in conflict settings and regarding longer-term climate impacts and gender considerations. Despite promising new tools and approaches, their practical application and institutionalization within ASP systems remain largely unexplored. Research gaps include the need for more practical support in integrating risk data into policy and design, addressing sectoral divides, and understanding the effectiveness of integrated approaches in practice. Further research is also needed on longer-term climate impacts, gender integration, and the application of emerging tools to enhance ASP resilience, and how this can better be integrated into social protection design and planning.

Potential research questions:

- **How can climate and disaster risk data be made more relevant to social protection?**
- **What are the barriers and opportunities to enhance integration of disaster and climate risk data and analysis into social protection system design and planning?**
- **How can social protection programmes respond to the longer-term impacts of climate change on livelihoods?**

Early warning systems (EWS)

The evidence indicates that Early Warning Systems (EWS) play a crucial role in facilitating rapid and anticipatory responses to climate-induced crises within ASP frameworks. Integrating EWS into social protection systems can streamline decision-making, secure financing, and enhance transparency in disaster response. However, significant challenges exist, including the need for viable social protection systems, technical limitations in data collection and analysis, and institutional barriers to effective integration. Research gaps include the need to address technical and political economy barriers, expanding the coverage of hazards considered by EWS, and improve the reliability and relevance of climate forecasts for ASP programming.

Innovative approaches such as Impact-Based Forecasting offer some promise for more accurate early warning that includes an understanding of how communities and households will be affected, but further research is needed into how to better integrate this into social protection systems. Big data approaches also provide opportunities for better forecasting, but further evidence would be helpful on concerns related to privacy and how individual, proprietary information can be misused in the process of machine learning.

- **What are the technical and political barriers and opportunities to linking EWS, including for anticipatory response, to social protection systems?**
- **How can disaster and climate risk data be more relevant for informing disaster response through social protection systems?**

Post-disaster assessment

Post-Disaster Impact Assessments (PDIA) and Post-Disaster Household Assessments (PDHAs) are crucial for understanding and addressing the impacts of disasters on social protection systems and planning and implementing disaster responses through social protection. While some countries have sophisticated assessment tools integrated into their disaster risk management systems, standardisation and institutionalization of PDHAs vary greatly, contributing to a lack of guidance and consistency in their quality. Key research gaps include the need for standardized approaches to PDHAs, especially in integrating them with social protection systems and improving their relevance for diverse types of shocks. Additionally, challenges such as fragmentation in data collection efforts, reliance on inefficient paper-based systems, and the balance between speed and comprehensive data collection remain areas requiring further investigation.

Potential research questions:

- **What are the best practices in integrating post-disaster assessments with social protection information systems to enhance data relevance for diverse types of shocks?**

The role of SPIS in ASP programming

SPIS play a crucial role in managing the outreach, intake, registration, eligibility determination, and delivery of social protection programmes. The uptake and extent of coverage of SPIS and social registries varies considerably around the world. Moreover, SPIS can vary significantly in their level of maturity, ranging from highly underdeveloped to highly sophisticated, with implications for the system's ability to support rapid and large-scale expansion in response to shocks. Nevertheless, SPIS have been shown to support disaster response in several ways including targeting, post-disaster data collection, planning and coordination, and design of resilience programmes. SPIS have played a crucial role in facilitating national responses to large-scale shocks in certain countries and contexts but are generally found to be more adept at supporting vertical rather than horizontal expansion.

Assessing SPIS for ASP programming

The literature on data relevance and quality highlights that even where SPIS have high coverage, several factors such as incomplete data, relevance of variables, currency, accessibility, and accuracy may impede their suitability for disaster response and resilience programming. For example, targeting approaches in social protection programmes may not fully align with disaster exposure and vulnerability, leading to incomplete coverage of affected populations. Furthermore, social registries may lack up-to-date information and face challenges in accessibility and accuracy. Further studies are needed to understand optimal variables for different ASP programmes, the trade-offs between data relevancy and collection costs, and best practices for producing current and timely SPIS data for disaster response. Additionally, research could explore ways to extend SPIS coverage to hard-to-reach areas and excluded populations, such as migrants, and improve data quality across various dimensions in different contexts.

Potential research questions:

- **What are current practices in integration of disaster and climate risk data into SPIS and how can this be optimised for different programmes and shocks considering the trade-offs between efficiency, relevance, and currency?**
- **What can be learned from current approaches to extending SPIS and social registries to hard-to-reach disaster- and climate-affected populations, including migrants?**

Institutionalising “adaptivity” into SPIS

This report has shown that to effectively utilize SPIS for disaster and climate response, certain key factors need to be addressed. Legal and policy frameworks play a crucial role in establishing the reliability and sustainability of SPIS. Investment in strengthening social registries before shocks occur and developing legislation that balances between flexibility and sustainability is essential. Moreover, policies should aim to dissociate targeting approaches from social registries to allow support for several types of programming objectives.

Institutional capacity building and preparedness are equally vital. Strengthening oversight and coordination mechanisms ensures SPIS readiness for diverse actors’ involvement, including humanitarian and disaster risk management agencies. Additionally, developing emergency operational guidelines and enhancing collaboration between sectors can improve shock responsiveness. Approaches to rapidly expanding registry coverage, such as on-demand registration and post-disaster household assessments, alongside innovative methods utilizing satellite and mobile data, can support more inclusive assistance. However, challenges like digital exclusion, the high institutional demands for on-demand approaches, and privacy concerns necessitate further research and investment in strengthening systems and preparedness measures in different contexts. Finally, ensuring interoperability between SPIS and other sector registries, national ID systems, and humanitarian databases, while prioritizing data protection and privacy, is crucial for effective ASP programming.

Despite a growing level of knowledge about building and maintaining effective SPIS in general, there are several gaps in relation to strengthening their ability to support adaptive social protection. Further research could be done into the technical and political economy factors that shape establishment of large-scale information systems that are used by multiple actors, including DRM ministries, and cooperation between ministries and departments for interoperable systems. Further research is also required on the potential levels of exclusion, especially of marginalised groups, from different types of SPIS and social registries when responding to crises. Humanitarian actors may require support to understand how to use and the implications of using national information systems, especially in contexts where the broader legal frameworks and institutions are weak. Practitioners would also benefit from better understanding the minimum requirements for data sharing that ensure transparency and accountability, including between government and private sector databases, and how to navigate the risks and potential of overly restrictive data sharing protocols.

Potential research questions:

- **What are the technical and political factors that shape interagency cooperation over data sharing and interoperability, including for large-scale national data information systems that support ASP?**
- **How big a problem is exclusion of marginalised groups from different types of SPIS and social registries during crises, and what can be done to reduce it?**
- **What are the minimum requirements for ensuring data protection, transparency and accountability while allowing for efficiency in data sharing between social protection agencies engaged in disaster response?**

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