



The role of index-based triggers in social protection shock response

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Key messages

- The inclusion of index-based triggers in social protection programmes is one of the innovations used to secure timely and adequate policy response in the event of a covariate shock.
- Factors which facilitate timely index-based *trigger activation* include: relevant, good quality data and clarity in the regulation of the trigger process.
- Effective *targeting* and timely *delivery* of social protection critically depends on the minimisation of basis risk, adequate programme coverage and contingency financing.
- Efforts to enhance the effectiveness of index-based trigger mechanisms include the reliance on a combination of indicators and double-trigger systems, investments in data collection and quality control systems and the development of clear trigger activation and policy response plans.

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Abbreviations

Abbreviation	Description
ARC	African Risk Capacity
ASAL	Arid and Semi-Arid Lands
CADENA	Component for the Attention of Natural Disasters
DRR	Disaster Risk Reduction
GCC	Government Catastrophic Coverage
HSNP	Hunger Safety Net Programme
IBLIP	Index-Based Livestock Insurance Programme
LEAP	Livelihoods Early Assessment Protection
LIAS	Livelihoods Impact Assessment Sheet
MDRC	Modelled Drought Response Cost
mNAIS	modified National Agricultural Insurance Scheme
NCIP	National Crop Insurance Programme
DCF	Drought Contingency Fund
NDMA	National Drought Management Agency
NDVI	Normalised Difference Vegetation Index
NGO	Non-governmental organisation
PSNP	Productive Safety Net Programme
RFM	Risk Financing Mechanism
SAC	Catastrophe Agricultural Insurance
SCTP	Social Cash Transfer Programme
SPI	Standardised Precipitation Index
VCI	Vegetation Condition Index
WBCIS	Weather-Based Crop Insurance Scheme
WFP	World Food Programme
WRSI	Water Requirements Satisfaction Index

1 Introduction

1.1 Background and motivation

One of social protection's objectives is to help individuals and households cope with covariate shocks: that is, with shocks that affect entire communities or large population groups at the same time. Shocks of this kind include economic crises, disasters associated with extreme weather, climate or geological events and conflict-related shocks. In such circumstances, the effectiveness of social protection response hinges critically on timeliness, adaptability/scalability and adequacy in terms of levels of resources. Policy needs rapid implementation at a large enough scale to reach the high number of people affected (Bastagli, 2014; Marzo and Mori, 2012).

One of the innovations used to help to secure timely and adequate policy response in the event of a shock is the inclusion of index-based triggers in social protection programmes. In this context, an index refers to an indicator typically drawing on a range of data to provide a single quantifiable measure (e.g. a weather index or an index of crop yields across a specified area). Such triggers are used to activate programme implementation and/or to target resources in the event of a shock.

A potential advantage of the inclusion of such mechanisms in social protection programmes is the degree of automatism and speed of response to a shock they can facilitate. Advocates also point to the potential for index-based trigger mechanisms to reduce programme monitoring costs and to help secure policy financing resources if they are (perceived to be) transparent and difficult to manipulate. An additional potential benefit is provided by their capacity to address moral hazard and adverse selection risks by relying on variables that are not directly influenced by human behaviour.

At the same time, concerns have been raised about the effectiveness of these triggers in practice. One potential shortcoming is related to the extent to which the indicator selected and the value at which the trigger threshold is set reflect people's actual circumstances and needs on the ground. The potential mismatch between people's needs and the underlying indicator of an index, or the threshold at which the trigger is set, can be obstacles to effective shock response. Furthermore, challenges encountered in the administration and functioning of the trigger-based system in practice, including the timely access to and use of quality data/information, suggest that such programme elements may perform differently than intended and even hinder effective shock response (e.g. Clarke and Vargas Hill, 2013).

Despite growing numbers of social protection programmes including index-based triggers as elements of their design, little has been written about the ways in which their design varies and about their functioning and effectiveness in practice. This paper proposes to address the gap in the literature by identifying variations in index-based trigger design, drawing together what we know about how such instruments work in practice and discussing their implication for the performance of effective social protection shock response.

The paper is organised as follows. After clarifying the main definitions employed in the paper, the next section reviews the potential advantages and limitations of the inclusion of index-based triggers in social protection programmes against the objective of effective covariate shock response. Section 3 outlines the ten social protection programmes with an index-based trigger component that make up the case studies analysed in this report. Section 4 identifies the variations in the design features of the index-based mechanisms in the case study programmes and reviews the evidence on the implementation and effectiveness of index-based triggers where they have been activated. The final

section discusses the implications that arise for the design and implementation of index-based triggers for effective social protection shock response.

1.2 Definitions

The main intervention of interest in this paper is social protection, understood to include both social assistance and social insurance programmes. The first set of instruments are non-contributory schemes, aimed explicitly at providing support to vulnerable individuals or groups. In contrast, social insurance is understood to involve ‘individuals pooling resources by paying contributions to the state or a private provider so that if they suffer a shock or a permanent change in their circumstances, they are able to receive financial support’ (Slater, 2011).

This study makes the distinction between social insurance as a form of social protection, where the government plays a key role in the regulation and/or use of public funds, and the growing range of private insurance policies provided either by the private sector or non-governmental organisations (NGOs). As noted in a recent World Bank policy brief, ‘The overall insurance agenda is broad, but it relates to social protection in so far as it supports people who are left out of the market to access insurance products and prevents vulnerable families from falling into destitution’ (World Bank, 2012). In the same vein, it is helpful to note the difference between two fundamentally different objectives found in agricultural insurance: helping the poor to protect their livelihoods and assets (protection insurance) or helping households with viable farm businesses to manage risks (promotion insurance) (Hess and Hazell, 2009). This review focuses on the former, which Hess and Hazell note will generally need to be subsidised in order to ensure coverage among target households and use special delivery channels aligned with emergency relief.

In considering social insurance, this study therefore only considers cases where the *government* plays a role either (a) as an insurer in part or all of the insurance programme (as in Mongolia, where the government was responsible for the Disaster Response Product component of the otherwise commercial Index-Based Livestock Programme), (b) as a policy holder (as in the African Risk Capacity initiative) where the government has specific plans to use insurance claims to finance social protection responses such as cash transfers or payments in-kind, or (c) where insurance programmes or premiums are subsidised by the government or international donors (as in the case of Kenya’s Index-Based Livestock Insurance Programme).

The paper’s focus on social protection and the role of index-based triggers in the context of covariate shocks links with the literature and experience on disaster risk reduction (DRR) and humanitarian and emergency response. Traditionally, these sectors have been considered separately and they broadly continue to have separate planning and administration processes, despite overlaps in their objectives, their reliance on common instruments and the similar challenges they encounter. At the same time, there has been a growing awareness of the need to consider social policy, DRR and emergency relief sectors in a more integrated way (Bastagli, 2014; Johnson et al., 2013; Vincent and Cull, 2012). One of the potential benefits of a more linked up approach is that it may help alleviate some of the weaknesses faced in separate areas (e.g. see Ashdowne, 2011, on traditional humanitarian responses), potentially leading to more timely and appropriate responses.¹

Index-based trigger mechanisms are one of the innovative instruments used in programmes across these sectors pursuing social protection shock response objectives. As a growing number of countries explore the enhanced coordination of social protection policy with disaster and humanitarian response, understanding the policy options and trade-offs in designing index-based triggers and the factors that contribute to their successful implementation is critical.²

¹ With respect to climate change specifically, this acknowledgment is captured by the elaboration of the expression ‘adaptive social protection’ which refers to ‘a series of measures which aims to build resilience of the poorest and most vulnerable people to climate change by combining elements of [social protection], DRR and [climate change adaptation] in programmes and projects’ (Arnall et al., 2010).

² For example, Rwanda has established a technical working group on linking social protection and early warning systems in order to better plan for climate change adaptation and social risk management (Siegel et al., 2011). The Government of Ethiopia is also developing a

2 The rationale for using index-based triggers in social protection

One of the central arguments in favour of using an index-based approach to identify and respond to covariate shocks is that, provided they are designed appropriately, they allow for a more timely response than alternative social protection activation and targeting mechanisms. Advocates argue that the reliance on an easily and independently observable index can facilitate quick, even automatic, shock response by minimising or entirely circumventing the need for information collected or submitted at the individual/household level, such as the need for an individual to formally file a claim. This would permit social transfers or insurance payouts to be disbursed quickly.

For example, in the case of agricultural insurance, one of the main advantages of using a weather-based index is that it can remove the need for time-consuming field inspections that form part of traditional indemnity insurance. If index-based approaches do indeed offer a more timely response, individuals and households should receive protection more quickly and will be less likely to engage in distress-selling of assets or other negative coping mechanisms such as reducing food intake.

Index-based triggers in social protection programmes can also support the adequacy of shock response by reducing the cost of providing social protection, through reduced monitoring and transaction costs, promoting efficiency and freeing up resources. As mentioned above, costly verification procedures – such as on-site inspections and individual loss assessments – can be avoided as a result of the use of an index or indices that are easily observable and of a level of aggregation above the individual or household level units (Gine, 2009).

Moreover, the reliance on such mechanisms may help to secure social protection financing resources. The transparency and difficulty of manipulating index-based trigger mechanisms (actual or perceived) and the potential for such instruments to minimise moral hazard and adverse selection risks could help secure additional resources and financing for social protection, including by securing more attractive investments from a range of stakeholders, such as private sector insurance companies or international reinsurers.

Moral hazard occurs when an insured individual modifies his/her behaviour in response to having insurance, altering the probability of an adverse outcome. In the case of adverse selection, individuals with higher than average risk seek insurance and those with lower than average risks find it uneconomical, leading to high overall social protection costs and increased drop-out of beneficiaries/the insured with lower risks. Adverse selection arises from asymmetries of information, for instance when insurers do not have the same information as individuals (e.g. regarding the likelihood of crop failure) or cannot obtain it economically.

National Policy and Strategy on Disaster Risk Management, which ‘aims to introduce a new approach to disaster risk reduction and management... [that] encompasses a complete cycle of disaster risk management: prevention, preparedness, mitigation, response, recovery and rehabilitation’ (Sandford, 2014).

Advocates of index-based triggers highlight how such risks can be minimised by relying on indexes that are independent of human behaviour. Because in such cases (by design) the behaviour of an individual cannot affect the probability of an adverse event, moral hazard concerns are limited. Similarly, the asymmetries of information that create adverse selection are reduced. In practice, this potential benefit has contributed to the expansion of index-based programmes such as rainfall index insurance products.

At the same time, the reliance on index-based trigger mechanisms gives way to the concern that the response may be inadequate as a result of the weak correlation between the index and need. The potential mismatch between changes in need and trigger indicators can limit adequate shock response. Writing about insurance mechanisms, Clarke and Vargas Hill (2013) make the point that in extreme cases, where there is fairly high *basis risk* (i.e. low correlation between the claim payment and loss), an indexed insurance product ‘can be detrimental to welfare, acting more like an expensive lottery ticket than a cheap way of purchasing protection’.

In the context of humanitarian interventions, Levine et al (2009) point to the potential inadequacy of the underlying indicator in index-based mechanisms and the implications for timely and effective emergency response. They examine the links between indexes, triggers and the activities supported and argue that although it seems obvious that the trigger for humanitarian response should be indicators relating to the severity of a humanitarian crisis, this will not always lead to the right response at the right time. For example, in the case of interventions that target livestock (e.g. supporting marketing, distributing livestock feed) they show that livestock need feeding when there is no pasture – not in the month when child malnutrition passes a certain threshold – and the trigger index should be determined with respect to the critical activity. They argue that the timing of appropriate interventions has a logic which derives from the activity itself, and not from the humanitarian situation. This needs to be reflected in the index used.

The weak correlation between trigger index and need, or basis risk, arises from the inadequacy of the underlying index with respect to capturing changes in need targeted by the social protection programme. In practice, this mismatch can also result from weak information systems. The threshold limit against which the trigger is activated is also critical to determining the adequacy of the performance of such tools with respect to need.

The literature identifies the main features of effective indices for index-based trigger mechanisms as being: easily measured, objective, transparent, independently verifiable and available in a timely manner. Moreover, they should display a probability function that can be reliably estimated. This implies that there is a stable time series of information (e.g. Alderman and Haque, 2007; Carter, 2009). The literature also provides examples of the ways in which the potential limitations of such mechanisms can be addressed. Options for tackling basis risk include efforts to complement or verify the index – for instance by having a double-trigger system – or incorporating some degree of ‘ground-truthing’ (Clarke and Vargas Hill, 2013). When it comes to implementation, the availability of good quality, timely and easily available data is recognised as a critical factor. Expected challenges to the effective implementation of index-based triggers for social protection shock response, particularly in areas at a high risk of rapid-onset shocks, include poor quality data and/or data that is not made available with sufficient frequency and timeliness.

The following sections explore these issues in further detail, relying on the experience of ten social protection programmes that include index-based trigger components, and shedding light on how such mechanisms vary by design, their implementation in practice, and the policy implications that arise from these examples.

3 Index-based triggers in social protection programmes: The case studies

We identify ten social protection programmes that include an index-based trigger component and that satisfy the requirements of reflecting the breadth of types of social protection programmes and adequate information availability. The ten case studies include social assistance/social safety net programmes, including examples linked to the African Risk Capacity initiative (ARC), and four social insurance programmes. These initiatives were selected with the objective of providing a detailed picture of the range of ways in which index-based triggers have been incorporated into social protection programme design, including both social assistance and insurance measures. An overview of the cases is reported below and summarised in Table 1. The details of the trigger-based mechanisms are discussed in Section 4.

3.1 Social assistance and safety nets

The social assistance and safety nets programmes included in the case studies sample are Ethiopia's Productive Safety Net Programme (PSNP), social assistance programmes linked to the ARC in Kenya, Mauritania and Malawi, and Kenya's Drought Contingency Fund.³

Ethiopia's PSNP is a cash and food transfer programme linked to public works for the able-bodied and forms an integral part of the government's Food Security Programme. The programme, which began in 2005, targets transfers to chronically food-insecure households over a six-month period for up to five years. In 2014, around 7.6 million households (approximately 10% of the population) were PSNP beneficiaries.

The index-based mechanism within the PSNP forms part of the Risk Financing Mechanism (RFM) which began in 2009 and is a dedicated fund that can be drawn upon in the case of drought to enable the extension in duration of PSNP transfers and expansion to non-beneficiary households within areas of PSNP operation (Gray and Asmare, 2012; Sandford, 2014). According to its design, the RFM may be triggered either on the basis of a given increase in the number of households requiring assistance following severe drought or by accumulated requests from sub-federal government (Ashley, 2009). In terms of the former, this was to be informed by two things. Firstly, a weather-based model called the Livelihoods Early Assessment Protection (LEAP) that involves the calculation of a Water Requirements Satisfaction Index (WRSI), which measures the extent to which rainfall levels are meeting the water requirements of specific staple crops within local government (*kebele*) zones using actual and estimated rainfall. Secondly, seasonal data on factors contributing to food consumption or cash income, compiled in Livelihoods Impact Assessment Sheets (LIASs) carried out at local

³ Although Malawi did not make it into the first ARC insurance pool in May 2014, their Operational Plan, upon which information in this paper is based, was available on the ARC website at the time of writing. This plan has since been revised but is not yet publically available.

government and district (*woreda*) level drawing on a wide range of data sources. It is important to note that the RFM was never designed to operate in the lowland areas in which pastoralist communities live and a separate design has been encouraged for a pastoral-specific RFM (Hobson, 2012).

Table 1: Case studies: Summary information

Country	Programme name	Index-based component	Type of programme	Coverage / number of beneficiaries or insured households
Safety net / social assistance programmes				
Ethiopia	The Risk Financing Mechanism in the Productive Safety Net Programme	Livelihoods Early Assessment Protection model	Cash / food transfer linked to public works for the able-bodied	7.6 million households in 2014 (10% of the population)
Kenya	Kenya Rural Development Programme	Drought Contingency Fund	Drought-response programmes led by drought-affected counties	23 Arid & Semi-Arid Land counties (out of a total of 47 in 2014)
Social assistance programmes linked to the African Risk Capacity initiative				
Kenya	Hunger Safety Net Programme	ARC ⁴	Cash transfer	100,000 beneficiaries in 2014 (<1% of the population)
Mauritania	Mauritania's ARC Operational Plan	ARC	Food rations and food for work programme	160,000 (4% of the population) (intended)
Malawi	Malawi's ARC Operational Plan	ARC	Unconditional cash transfer, public works and food aid	271,000 (2% of the population) (intended)
Social insurance				
Mongolia	The Government Catastrophic Coverage component of the Index-Based Livestock Insurance Programme	Index-Based Livestock Insurance Programme	Public-Private livestock insurance programme	15,000 households in 2014 (10% of herder households)
Kenya	Index-Based Livestock Insurance	Index-Based Livestock Insurance	Subsidised livestock insurance programme	4,000 livestock herders in 2014
Mexico	Component for the Attention of Natural Disasters	Catastrophe Agricultural Insurance	Subsidised small-scale agricultural insurance programme (including livestock and fisheries)	2.5 million small-scale agricultural households from 30 of Mexico's 32 states in 2013.
India	National Crop Insurance Programme	Modified National Agricultural Insurance Scheme	Subsidised insurance for food crops, oilseeds and selected commercial crops	946,000 farmers in 2012/13 <i>Rabi</i> season and 2.1 million in 2012 Kharif season (<1% of the population)
India	National Crop Insurance Programme	Weather Based Crop Insurance Scheme	Subsidised insurance for food crops, oilseeds and selected commercial crops	5.6 million farmers in 2012/13 <i>Rabi</i> season and 8.9 million in 2013 Kharif season (<1% of the population)

Sources: (Government of Kenya, 2013; Government of Malawi, 2014; Government of Mauritania, 2014; Ministry of Agriculture, 2014; Project Implementation Unit, 2012; Sandford, 2014; Wandera and Mude, 2010; World Bank, 2013; Yadamsuren, 2014).⁵

Kenya's DCF was set up at the National Drought Management Agency (NDMA) through the European Union Kenya Rural Development Programme. The fund has been viewed as a precursor to a National Drought Disaster Contingency Fund, though at the time of writing it had not been formally

⁴ There are currently plans in place for the HSNP to incorporate a further index-based mechanism within it, independent of the ARC. Further details on this are provided in the text below.

⁵ Information on Kenya's DCF from interviews and correspondence with a key informant from the ASAL Drought Management Project.

established and so reference is made here to the DCF. The DCF provides a dedicated source of financing to Arid and Semi-Arid Lands (ASAL) districts in the event of a drought, which as of 2014 covered 23 of Kenya's 47 counties. The index-based mechanisms in the DCF are used to indicate whether individual counties from the ASAL area are considered to be entering the Alert phase in a six-phase drought classification (Normal, Alert, Alert Worsening, Alarm, Emergency and Recovery). The parameters that define each of these phases are based around a number of environmental indicators, including a Standardised Precipitation Index (SPI) and Rainfall Condition Index to measure meteorological drought, a Vegetation Condition Index (VCI) for agricultural drought and a numerical index for hydrological drought. Socioeconomic indicators are also used to measure changes in agricultural production, access to markets, food and water, and welfare (e.g. nutrition and coping strategies). The specific responses related to meeting the thresholds of the index-based trigger are set out in county Contingency Plan documents and are based around supporting coping strategies and livelihoods of drought-affected populations, particularly pastoralists. Thematic areas covered include water and sanitation, agriculture and livestock, health and nutrition, peace and security, with social protection activities typically include livestock de-stocking, provision of veterinary services and distribution of seed and fertiliser.

Before summarising the social assistance programmes linked to the ARC, this section provides a brief overview of the ARC itself.⁶ The ARC is a specialised agency of the African Union that operates a sovereign catastrophe risk pool, providing insurance to participating countries against severe drought events (once every five or more years). Insurance is provided through ARC Ltd., which is a financial affiliate of ARC agency with reinsurance provided by the private sector. Before a country is eligible to buy insurance from ARC Ltd. it must first have a contingency plan, detailing how a potential payout would be spent to assist affected populations in a timely and effective manner, approved by the ARC Agency Governing Board. ARC Ltd.'s index-based drought insurance contracts are based on *Africa Risk View* (ARV), a model developed by the United Nations World Food Programme (WFP) to estimate the number of people affected by a drought event during a rainfall season and then the dollar amount necessary to respond to these affected people in a timely manner (see Box 1 for detailed information on the ARV).

At the time of writing the ARC was fully operational and its first payouts for a total of US\$ 25 million were made in January to Mauritania, Niger and Senegal (ARC, 2015). Plans are currently in place to provide countries with coverage for tropical cyclones and floods (in addition to drought) from 2016 (ARC, 2015).

As of December 2014 there were 25 countries signed up to the ARC, four of which had paid a premium for five seasons into the insurance pool and were therefore covered under the ARC's first risk pool, which started in May 2014 (Kenya, Senegal, Niger and Mauritania). The second insurance pool starts in May 2015 with an additional four countries insured against drought. The social assistance programmes linked to the ARC which are covered in this review were chosen based on the availability of country Operational Plans, which are required under the ARC before countries are able to receive any payouts. The countries covered here are Kenya, Mauritania and Malawi. Further details of the programmes summarised below are presented in the country's Operational Plans (Government of Kenya, 2013; Government of Malawi, 2014; Government of Mauritania, 2014).

⁶ We are grateful to Joanna Syroka from the ARC Secretariat for providing the following information.

Box 1: The African Risk Capacity's ARV model for estimating the number of people affected by a drought and the cost of response

The ARC's Africa Risk View (ARV) model is based on satellite rainfall estimates, which are used to calculate a drought index (the WRSI) within each insured country. The satellite rainfall estimates are available across Africa every 10 days at a resolution of approximately 10km by 10km, and the WRSI is also calculated at this resolution. For the purposes of identifying a drought, the WRSI is aggregated at the 'vulnerability polygon' level. Vulnerability polygons are specific geographical units within a country for which information on household vulnerability to drought exists and is statistically representative; they are usually administrative units or livelihood zones. The WRSI is aggregated at the vulnerability polygon level by taking the average of all WRSI grid point values that fall within each polygon. This average WRSI value is then compared to the polygons's historical baseline WRSI – the level that represents 'normal' WRSI levels. Drought severity is then determined at the polygon level and defined as the extent of the negative deviation of the aggregated WRSI at the end of a rainfall season from its normal level, and whether certain drought triggers below the normal are reached.

The next step in the ARV methodology is to convert this information into a drought-affected population estimate for that polygon. In order to do this, each polygon is given a household drought vulnerability profile. These profiles are static within ARV and are calculated outside of the software from available household survey data, such as the government and WFP Comprehensive Food Security and Vulnerability Analysis surveys available in many countries. Vulnerability profiles define what percentage of the population living in each polygon is at risk to mild, medium and severe drought, as defined by the drought triggers, and what percentage of the population is not at risk to drought. In this way, when a WRSI value is observed, ARV can estimate at a high-level how many people in the polygon could be affected. The final calculation within ARV involves estimating response costs for the estimated populations affected. This is done by simply multiplying the estimated populations affected, by a response cost per person multiplier, which is based primarily on a government's budgeted contingency plans. The estimated response costs are added up across all the polygons in the country to estimate a final national Modelled Drought Response Cost (MDRC). ARC Ltd. insurance contracts are based on the MDRC and payouts are triggered to countries if, at the end of the season, the observed MDRC exceeds a pre-defined threshold chosen by the country in its insurance contract, defined as the 'attachment point'.

In Kenya, the programme linked to the ARC is the Hunger Safety Net Programme (HSNP), which is one of five cash transfer schemes under the country's National Safety Nets Programme, focusing specifically on the poorest vulnerable households in the four arid counties of Turkana, Mandera, Wajir and Marsabit. The HSNP currently provides unconditional cash transfers to beneficiaries to the value of 4,900 Kenyan Shillings (KES) (approximately £35) every two months (HSNP, n.d.).⁷ As of 2012, 100,000 households were supported through the programme (Ndoka, 2013).

In Mauritania, the two initiatives linked to the ARC come under the government's multi-sector plan – 'EMEL' ('hope') – launched in 2012 to strengthen the purchasing power of low-income households through food subsidies. While there are related initiatives already in place, those covered under the ARC will involve the launch of discrete activities rather than an extension or scale-up of existing programmes. The first activity is a monthly food ration for up to five months of 50 kg of wheat and

⁷ All exchange rates used in this paper were taken from Oanda.com in March 2015.

four litres of cooking oil per household, targeted to up to around 109,000 vulnerable households following a needs assessment in areas identified through semi-annual household food security surveys. Rations will be specifically aimed at households with no income that have been severely affected by drought, with a particular focus on female-headed households, the disabled, vulnerable families with young children, pregnant women and food-insecure households. The second activity is a cash transfer programme that will target food coupons up to the value of 13,950 Mauritanian Ouguiya (MU) per month as of 2014 (approximately £30) to 50,000 vulnerable peri-urban households between February and June. Transfers will be conditional on participation in public works (45 days over five months) for households with able-bodied individuals or unconditional for single female-headed households or those headed by individuals unable to work.

The social protection activities in Malawi linked to the ARC include two existing programmes and temporary monthly food rations. One of the existing programmes that would be scaled up under the ARC is the Social Cash Transfer Programme (SCTP), which is an unconditional bi-monthly cash transfer targeted to ultra-poor labour-constrained households (Abdoulayi et al., 2014). The monthly equivalent transfer levels differ depending on the household composition, from 1,000 Malawian Kwacha (MWK) (£1.50) for a single-headed household to MWK2,400 (£3.70) for a household of four or more, with additional bonuses depending on the number of household members enrolled in school (MWK 300 per primary pupil and MWK 600 per secondary school pupil) (Abdoulayi et al., 2014). Under the ARC, transfers to around 35,500 existing SCTP beneficiaries would topped up during September and October from an average of MWK 2,200 (£3.40) to MWK 18,000 (£27.50). The second existing programme in Malawi is the Public Works Sub-Programme (PWSP), which as of 2014 provided cash for work to just over 330,000 beneficiaries in 15 of the country's 28 districts at a daily wage of MWK 400 (£0.60) for 48 days of the year. Under the ARC, daily wages would be increased during September and continued in October based on local food prices to allow for the purchase of a defined basket of food. Using 2013 food prices, up to 36,300 households would receive an average monthly top-up of MWK 13,200 (£20.20) in September (in addition to the regular MWK 4,800 transfer) and MWK 18,000 in October. The final component of the social protection activities in Malawi involves monthly food rations for to up to 200,000 labour-constrained, food insecure and ultra-poor households in the most drought-affected livelihood zones over a four-month period (August to November).

3.2 Social insurance programmes

The case studies analysed in this paper also include the following four social insurance programmes:

- The Government Catastrophic Coverage (GCC) component within Mongolia's Index-Based Livestock Insurance Programme (IBLIP)
- Index-Based Livestock Insurance (IBLI) in Kenya
- Mexico's Catastrophe Agricultural Insurance (SAC) which forms part of the Component for the Attention of Natural Disasters (CADENA) programme
- The modified National Agricultural Insurance Scheme (mNAIS) and the Weather-Based Crop Insurance Scheme (WBCIS) as part of India's National Crop Insurance Programme (NCIP).

Mongolia's IBLIP is a commercial insurance programme that covers herders against losses to their livestock from severe winter weather conditions (*dzuds*), characterised by low temperatures, wind, snow and ice. However, given the limits to commercial coverage, the government established a Disaster Response Product (DRP) which covered all herder households (including the uninsured) for losses beyond the limit of the commercial insurance. This was abandoned in 2009 and became the GCC, which only covered farmers who had already purchased commercial insurance (Luxbacher and Goodland, 2011). Census data is used to estimate a district-level livestock mortality index which, once

it passes a set threshold, triggers a payout to policy-holders. The IBLIP started as a pilot in 2006 and was operational in all provinces by 2012, when approximately 50,000 herder households (out of a total of around 170,000) were covered by livestock insurance (Project Implementation Unit, 2012).

The IBLI in Kenya is another case of livestock insurance but where the underlying rationale was to cover pastoralists from drought.⁸ The index-based mechanism relies upon the use of satellite data to calculate a vegetation index which provides estimates of forage availability to allow for the prediction of livestock deaths. Once the predicted livestock mortality rates reach the thresholds set out in the individual policy-holder's insurance contract a payment is triggered for the end of the long dry season or the end of the short dry season. Although the intention has been for IBLI to operate on a fully commercial basis, it is included in this review as an example of social insurance as the premiums continue to be subsidised. The IBLI started as a pilot in 2010 and as of November 2014 was operational in the districts of Wajir, Isiolo and Marsabit. As of mid-2014, 4,000 livestock herders had purchased the IBLI insurance (Burness Communications, 2014).

Mexico's SAC is one of two components of the CADENA programme and just one of a wide range of subsidised agricultural insurance initiatives in Mexico (World Bank, 2013).⁹ As a whole, the programmes offered under the SAC are designed to cover farmers, livestock producers, aquaculture farmers and fishermen and the programmes can be divided into parametric weather index insurance and area-yield based index insurance. This review here focuses only on the weather index insurance for farmers.¹⁰ The SAC was originally intended as a safety net and operates through state governments acting as policy-holders (rather than individuals as is the case for Mongolia's IBLIP, Kenya's IBLI and the two Indian schemes below), purchasing insurance to protect their budgetary allocations when they are required to respond to natural disasters that affect the most vulnerable farmers. As of 2012, the federal government covered between 75% and 90% of the premiums. The index-based mechanism for farmers is based around the use of weather data collected from national weather stations, which are used to determine whether the level of rainfall and temperatures are within locally-required bounds calculated using historical data in order to ensure a minimum level of crop production. If thresholds are met, payments are triggered, with payment levels set based on the land owned and crops grown. For example, payouts are higher for those growing high-value crops such as fruit or coffee. The indicators also cover hurricanes and windstorms. As of 2014 the CADENA crop insurance programmes covered around 2.5 million smallholder beneficiaries from 30 of the 32 states in Mexico (World Bank, 2013).

The schemes reviewed as part of India's NCIP – the mNAIS and WBCIS – form two of the NCIP's three components, the third being the Coconut Palm Insurance Scheme. The mNAIS and WBCIS both provide subsidised insurance for food crops, oilseeds and selected commercial crops but offer alternative choices for states, which can opt in to either. In states that choose to participate in the mNAIS, having an insurance policy is a mandatory requirement for all farmers that borrow from financial institutions but is voluntary for farmers without loans. One of the main areas of difference between the mNAIS and the WBCIS is around the indexes used. In the former it is based around a combination of an index of crops yields for a defined area (an insurance unit) and a weather-based index to facilitate early part-payments to policy-holders in the event of a large shock. In the WBCIS, the indexes used are purely weather-based (different types of indexes are provided by different private insurers). In 2012, 946,000 and 2,063,000 farmers were insured through the mNAIS in the *Rabi* (winter crop) and *Kharif* (monsoon crop) seasons respectively. Under the WBCIS, 5,606,000 farmers were insured in the 2012/13 *Rabi* season and 8,927,000 in the 2013 *Kharif* season (Ministry of Agriculture, 2014). The mNAIS began as a pilot in 50 districts in the 2010/11 season and became a fully-fledged scheme from 2013/14, though built on an earlier National Agricultural Insurance Scheme which started in 1999. The WBCIS began as a pilot in 2007 and had expanded to 18 states by 2013 (Ministry of Agriculture, 2014).

⁸ The IBLI also operates in some areas of Ethiopia but on a purely commercial basis.

⁹ The other component is an ex-post climatic disaster compensation scheme in states not covered by SAC.

¹⁰ The wide range of other interesting developments in Mexico include the use of satellite data to measure losses in pasture quality and grazing for livestock farmers (World Bank, 2013).

4 The design and implementation of index-based triggers

This section analyses in greater detail the design and implementation of the index-based triggers under review. It identifies the main dimensions across which index-based trigger mechanisms vary by design (e.g. indicators and data sources, thresholds and trigger activation processes) (summarised in Table 2). It then reviews the experience of index-based social protection mechanisms that have been triggered in practice. It examines whether, when a target was met, planned responses were activated as intended, and identifies the main factors that facilitated or acted as obstacles to the planned functioning of the system.

4.1 Index-based triggers: Design features

4.1.1 Shocks covered

Programmes vary depending on the main shock(s) they are designed to address. In all cases there is a clearly stated main shock the programme was originally designed to respond to. For example, Ethiopia's RFM, the ARC and Kenya's IBLI and DCF are all explicitly set up to cover drought. In Mongolia's IBLIP, the stated objective is to protect herders from frequent *dzuds*, while Mexico's SAC protects primarily against a number of specific perils (inadequate or excess rainfall, hurricanes and windstorms). In India, the mNAIS is intended to cover farmers against multiple perils that may affect crop yields, while the WBCIS is explicitly aimed to address a range of weather-related shocks arising from rainfall, extreme temperatures or humidity, depending on the insurance contract that is held.

In practice, some index-based triggers may facilitate a social protection response due to shocks beyond those mentioned in the official design of the programme. For example, in the case of Mongolia's GCC, which uses mortality data as its underlying indicator, this could effectively allow for coverage of multiple perils that might result in livestock death. Pasture lost due to fire was the main cause of a high level of mortality in one county (*soum*) in an eastern province (*aimag*) in 2012, though payments were still made.¹¹ Also, while Ethiopia's RFM was established for covering drought, in practice due to its flexible nature it appears to have ended up being used to also respond to other shocks such as floods, conflicts, hailstorms, crop pests and diseases in early 2014.¹²

¹¹ Correspondence with a key informant from the IBLIP.

¹² Correspondence with a key informant from the PSNP donor coordination team.

Table 2: Key design features of the selected index-based trigger mechanisms

Mechanism	Shocks addressed	No. of indicators	Type of trigger indicator(s)	Data type and sources	How trigger thresholds determined
RFM (Ethiopia)	Drought	Single	Increase in number of beneficiaries. Index-based indicator component is the LEAP model, calculated through a weather-based index that estimates a Water Requirements Satisfaction Index (WRSI) to predict yields.	Rainfall data from national meteorological stations supplemented with satellite data which estimate rainfall	Specific thresholds to trigger the decision-making process appear to be flexible and decided by committee.
DCF (Kenya)	Drought	Multiple	Entry into a specific drought phase, determined by a wide range of indicators (biophysical, production-related and relating to market/food/water access and welfare). Index-based components include: (i) Standardised Precipitation Index (SPI) and Rainfall Condition Index (RCI) measuring meteorological drought, (ii) a Normalised Difference Vegetation Index (NDVI) measuring agricultural drought and (iii) a hydrological drought index.	(i) Rainfall data from national meteorological stations supplemented with satellite data based on analysis of storm clouds (ii) Remote satellite data measuring photosynthetic vegetation activity (iii) County level key informant interviews from strategic water source sites	Thresholds based around drought cycle management phases developed by the earlier Arid Lands Resource Management Programme. Non-biophysical indicators use deviation from historical local averages.
ARC	Drought	Single	National Modelled Drought Response Costs (MDRC) associated with insufficient rainfall, impacting the livelihoods of vulnerable people, calculated through a WRSI and household vulnerability profiles. MDRC are the final output of ARC's <i>Africa Risk View</i> model (see Box 1).	Estimated rainfall from satellite data from the US National Oceanic and Atmospheric Administration	Triggers within the ARV model are selected by countries during the ARV customisation process so that modelled results and MDRCs accurately reflect past drought events. Overlying insurance triggers are selected by countries, based primarily on the cost of coverage offered by ARC Ltd. as well as the other risk management mechanisms available to the government. These premiums are determined by ARC Ltd. based on actuarial pricing analysis of past drought events.
IBLIP (Mongolia)	Extreme cold weather-related livestock deaths	Single	Actual livestock mortality	Biannual census data from the national statistics office	Actuarial pricing analysis based on past herd losses and viability of risk levels for commercial insurers.
IBLI (Kenya)	Drought-related livestock deaths	Single	Estimation of forage coverage using a NDVI to predict livestock mortality	Satellite data	Actuarial pricing analysis based on past livestock losses as well as farmers' pricing considerations

Table 2: Key design features of the selected index-based trigger mechanisms (continued)

Mechanism	Shocks addressed	No. of indicators	Type of trigger indicator(s)	Data type and sources	How trigger thresholds determined
SAC (Mexico)	Inadequate or excess rainfall, hurricanes or windstorms	Multiple	Rainfall in millimetres used to measure drought and excess moisture and wind data	Rainfall and wind data from national weather stations	Use of historical data to calculate estimable statistical relationship between rainfall/temperature and crop production at different stages in specific agro-ecological zones through a specially designed Simulation Model for Agricultural Insurance.
mNAIS (India)	Multiple perils affecting crop yields	Two	Actual crop yields (with possibility of weather-based index triggering early part-payment in case of large losses)	Crop-cutting experiments carried out by local government agents (weather index uses weather readings from automatic weather stations)	Based on historical average yields in each insurance unit area.
WBCIS (India)	Weather-related shocks	Single	Weather-based index (a range available depending on insurance company used, including rainfall, temperature and humidity-based)	National weather readings from automatic weather stations	Based on actuarial analysis using historical data

4.1.2 Nature and type of indicators

While most of the mechanisms reviewed rely on a single or low number of indicators to trigger a response, Kenya's DCF stands out as having a large number of indicators including biophysical, production-related and relating to market/food/water access and welfare. The rationale behind this is to be able to provide a comprehensive picture of a drought situation as drought may manifest itself in many different ways and therefore not necessarily be captured through a single indicator.¹³ For example, even within the biophysical indicators there are indicators for meteorological drought, agricultural drought and hydrological drought, each of which provide a different insight into the potential emergence of a drought-related shock (NDMA, 2014b).

The remaining mechanisms in programmes reviewed here rely on a smaller number of indicators. For example, Mexico's SAC indicators cover excess and insufficient rainfall, hurricanes and windstorms while India's mNAIS incorporates a crop yield index and weather-based index. The ARC, Kenya's IBLI, Mongolia's IBLIP and India's WBCIS depend on single indicators.

In terms of the type of indicators, a key distinction is between those that, by design, would allow for an ex ante (predictive) response to emerging covariate shocks and those that can only allow for an ex post response (after the shock has happened). In the case of the mortality indicator in Mongolia's IBLIP and the crop yield indicator in India's mNAIS these only allow ex post response.

The concern of limiting policy response to the aftermath of a shock by relying on ex post indicators was addressed in Mongolia's IBLIP – which relies on a livestock mortality index - through the introduction of a new mid-year census after the winter months, with a public announcement of livestock mortality data in July to allow for insurance payouts in August.¹⁴ However, depending on how severe and sudden a given shock is, this set-up could still leave households without financial support for several months. In Mongolia's programme, this issue also led to discussions over introducing an NDVI using satellite data within the IBLIP to help predict future losses, though there were concerns that replacing the actual mortality indicator with the NDVI would introduce greater basis risk.¹⁵ In the case of India's mNAIS, a weather index has been incorporated within the index-based trigger mechanism to anticipate shocks before they register through the crop yield indicator and provide early payments when it is clear that yields will be below the required 'normal' thresholds.

A further issue concerns the extent to which the indicators being used are proxies of key variables of interest (e.g. estimated rainfall based on cloud coverage and temperature or vegetation as a proxy for fodder availability) rather than directly observed measures of those variables (e.g. actual rainfall, fodder availability or actual crop yields). Where proxies are used, holding all else equal, it would appear to imply greater scope for basis risk as it depends then on the strength of the relationship between the proxy indicator measured, the indicator it is a proxy for and the final outcome variable of interest (e.g. drought or livestock deaths). The correlation between the proxy and main indicator always has some scope for error while the correlation between the main indicator and the final outcome of interest is crucially dependent upon the quality of the statistical modelling used to estimate the relationship between the relevant shock and outcome variable of interest.

The issue of basis risk, in so far as it relates to choice of indicators, has been discussed within the context of India's mNAIS in terms of the relative advantages and disadvantages of using the area yield index and a weather-based index. It has been argued, for example, that crop insurance based on an area yield index may offer lower basis risk than weather-based index insurance (Carter, Galarza, and Boucher, 2007). Preliminary statistical analysis carried out by the World Bank on yields between 1999 and 2007 found fairly high levels of basis risk associated with weather-based index data (leading to both the transfer of payments in years with good yields and failure to give payments in years with

¹³ Interview with key informant from the ASAL Drought Management Project.

¹⁴ Correspondence with a key informant involved in the IBLIP.

¹⁵ Correspondence with a key informant from the IBLIP.

bad yields) (Clarke et al., 2012). This is partly due to area yield indicators being able to cover more perils than weather-based indicators, but also the area units covered by insurance are typically smaller in India for the crop yield index than for India's WBCIS because of limited weather station infrastructure. However, because area yield payments require crop-cutting experiment results to be submitted and verified there can be a trade-off in that it can take longer to access data than for the weather-based index data, which can be collected in real time. In the end, this trade-off has led to the attempt to draw on the benefits of both in the case of the mNAIS, which, as mentioned above, uses a combination of a weather-based index and crop yield index (Mahul, Verma, and Clarke, 2012). A further potential trade-off here relates to differences in the level of data quality, discussed below.

4.1.3 Differences in the end client

An important distinguishing design feature of index-based trigger mechanisms concerns who is the end client of the mechanism. For example, whereas with the ARC it is governments who are provided with resources in response to a shock, in the case of individual farmer insurance, such as the weather insurance examples from India, it is the farmers who may be considered the end clients. Depending on the specific design of the mechanism, this feature can have crucially important implications in terms of how basis risk is managed. For example, whereas with individual farmer insurance any gap between the losses identified by the index and actual losses incurred by the farmer must be borne directly by the individual, in the case of mechanisms where governments are end clients, such as the ARC, countries have greater flexibility to manage any such basis risk, by channeling resources to those areas in greatest need.¹⁶

4.1.4 Data and data sources

Index-based trigger mechanisms in social protection programmes also vary depending on the type and number of data sources used and the frequency with which data are collected. These in turn have implications for data quality, reliability and the timeliness of any social protection response.

Before considering these dimensions, a distinction needs to be made between two main types of variables, referred to here as 'variable' and 'fixed'. This distinction is particularly important for mechanisms that rely on modelling, where the variable data relate to the main variables of interest that change and ultimately determine whether thresholds are met or not (e.g. rainfall or its proxies such as storm cloud density, or photosynthetic vegetation imagery). Other examples of variable data from mechanisms that do not rely in the same way on modelling include livestock mortality in Mongolia's IBLIP or actual crop yields in India's mNAIS. By contrast, fixed data refers here to the supplementary data that is required in some of the models in order to calculate the overall indicators of interest that may trigger a response. For example, in the case of the ARC, while the main variable data is estimated rainfall based on remote satellite imagery, the model used to determine whether the main indicator – MDRC – exceeds the defined thresholds that would trigger a response also depends on per person response costs, district-level poverty gap data and data on proportions of household income derived from agricultural activities, all of which can be considered fixed data in that it does not vary with any great frequency (e.g. on an annual basis when model parameters may be updated). With the distinction between variable and fixed data in mind, the discussion below and in Table 2 focuses on the former.

There is a wide variety in the number of data sources for the index-based mechanisms. Ethiopia's RFM is dependent upon one of the widest range of sources, from multiple government departments at various levels, development partners and satellite data from a number of external sources. This includes the Central Statistical Agency, National Meteorological Agency, Ministry of Agriculture and

¹⁶ We are grateful to Joanna Syroka for this point.

Rural Development, Early Warning Response Directorate, Livelihoods Integration Unit, World Food Programme, EU Joint Research Centre and Famine Early Warning Systems Network. Corresponding with the large number of indicators, Kenya's DCF also relies on a large number of data sources that span local government, the national meteorological department and satellite data from two European universities. By contrast, the other mechanisms depend exclusively on one or two national agencies or ministries (Mongolia, Mexico and India) or an individual external source (IBLI Kenya or ARC).

It is important that data are collected with sufficient frequency in order to allow for a timely and effective response. In terms of the frequency of data collection, this in part is associated with the type of indicator and whether it allows for an ex ante response or not. So, for example, while mechanisms that use satellite data such as Ethiopia's RFM, Kenya's IBLI and DCF and the ARC use data that are collected every seven to ten days, two of the ex post indicators – livestock mortality in Mongolia's IBLIP or crop yields in India's mNAIS – are gathered far less frequently (twice yearly or at the end of each agricultural season respectively). Among those the mechanisms that rely fully or in part on national weather data from weather stations (weather-based index indicator in India's mNAIS, the WBCIS, Mexico's SAC and national weather data in DCF and RFM), some stations provide data in real time while for others data must be collected manually. For example, India's WBCIS relies on automatic weather stations whereas in Mexico's SAC some stations are automatic and others are manual. These differences have implications for the speed with which shock responses can be made.

A key question arising from the number of data sources and frequency of data collection or availability is whether they allow for a timely response. In the case of Kenya's HSNP, in current plans for an independent drought response (different to that under the ARC, though ARC funds would be used to scale up the HSNP response further if triggered), one of the key rationales for proposing a single indicator is that the incorporation of additional information sources may end up delaying the response time.¹⁷ However, it has been recognised that in using a single indicator there may then be some trade-off in terms of higher basis risk (e.g. the indicator may not capture more localised drought events).

In terms of quality, we are interested in the scope for data offering more or less reliable measures of predicted or actual shocks. Related to the data sources, this might include scope for human error or tampering, scope for technological error and even the level of aggregation available (e.g. whether data are collected at district level or below, or what resolution the satellite data are).

Where trigger mechanisms rely on data collected manually (e.g. crop-cutting exercises by local government agents in India's mNAIS) there may be some scope for greater error and therefore lower quality or less reliable data. There may be some means of partly addressing this through the use of technology or triangulation of data. For example, to address the problem in India's mNAIS, the government has recommended that GPS-enabled camera-fitted devices may be used in order to minimise the risk of misreporting while at the same time speeding up the data transmission process (Ministry of Agriculture, 2014).

However, even if rigorously enforced there is likely to still be some scope for errors or interference, potentially political, which has been an important concern in the literature. The de-politicisation of resource distribution was mentioned as one of the rationales behind using weather station data in the case of Mexico's SAC (Skees et al., 2007). Also, according to a key informant involved in Kenya's HSNP, it is for this reason that the current plans for an additional index-based trigger to scale up the HSNP involve the exclusive use of satellite data for triggering a social protection response.¹⁸ Part of that choice also emerged from the need to secure sustainable financing and the belief that, unless satellite data were used, private sector insurance companies would not consider supporting the mechanism.

¹⁷ From discussion with a key informant involved in the design of an alternative index-based mechanism for scaling up the HSNP.

¹⁸ Interview with key informant involved in the HSNP.

It should be noted though that Mongolia's IBLIP does make use of international reinsurance markets on the basis of agricultural census data collected by the government. When asked about concerns that had been raised over a potential conflict of interest (with the government collecting data and also having a potential interest in limiting its own exposure to payouts), it was claimed by a key informant involved in the IBLIP that any such scope was 'almost absent' due to the National Statistics Office (which collects the data) reporting to the Parliament, and government commitments to extend protection to as many herders as possible to fulfil the constitutional statement recognising livestock as national wealth to be protected by the state.¹⁹

While scope for error is not eliminated when it comes to the use of more automated technologies (especially where someone has to operate the technology and handle the data retrieved) it may limit the opportunities for error or for intentional interference.

The level of data aggregation and the related precision of indicators also matter. For example, whereas remote rainfall data in Ethiopia's RFM are supposed to be provided in pixels of 1 km², the remote rainfall data used by Kenya's DCF are provided at 4 km², meaning that the RFM may in practice be able to detect more localised shocks and be less prone to basis risk. Also, whereas meteorological station readings may be more accurate than satellite data (which rely on proxies as suggested above), because of the limited number of weather stations, the reported weather values cannot be extrapolated to large areas.²⁰

The extent to which this has implications for actual social protection responses partly depends on the determination of trigger thresholds (discussed below) as unless the thresholds are set in a way that allows for localised responses, the level of aggregation of the data may not mean a great deal. However, once a response is activated, mechanisms that use more localised data should in theory allow for a more appropriate response to specific areas and demonstrate lower basis risk, as suggested above in the discussion on the use of the crop yield index in India.

4.1.5 Determination of threshold levels

In the case of Ethiopia's RFM there do not appear to be clear explicit thresholds beyond which a trigger would automatically be activated. Instead, according to the mechanism's design, indicators are monitored and referenced against thresholds 'assigned on the basis of long-term averages' with expert consultation then used to interpret the results (Ashley, 2009: 24). In this sense the threshold levels appear to be somewhat more flexible than is the case of the other programmes reviewed.

In Mexico's SAC, thresholds have been determined by imputing historical data on rainfall and production into simulation models that identify the required rainfall levels to ensure a minimum level of crop production in a given agro-climatic zone. The robustness of the thresholds was tested during a pilot through field tests. Thresholds are set at the same level for all farmers within a particular zone and are updated on an annual basis by incorporating the most recent rainfall and production data into the risk models that are used (Hazell et al., 2010).

In Kenya's IBLI, thresholds are based around predicted livestock losses expressed as a percentage of mortality within a given division. The thresholds and associated costs for policy-holders are determined through an actuarial analysis of data on past livestock losses. Individual policy-holders are then able to decide whether to purchase a contract with a threshold of 10% or 15% mortality (the lower threshold being more expensive) (Chantararat et al., 2013).

In Mongolia's IBLIP, thresholds for the commercial insurance component were based upon an actuarial analysis based on past herd losses and the viability of different risk levels for commercial

¹⁹ Correspondence with key informant involved in the IBLIP.

²⁰ Correspondence with key informant from the ASAL Drought Management Project.

insurers. The threshold of the subsidised component – the GCC – which provides coverage after the point at which commercial insurance no longer covers individual policy-holders, was set at a livestock mortality rate of 30% at the district level. This was chosen on the basis that 30% animal mortality is the range where ‘tail risk’ starts to occur and commercial insurers can no longer provide insurance that remains affordable for herders.²¹

Thresholds for crop yields in India’s mNAIS are calculated based on *probable yield* multiplied by the *indemnity level*. Probable yield is calculated per hectare using a seven-year moving average of actual past yields during each season within each insurance area unit. The indemnity level is determined at a district level (for each crop covered) based on 10 years of data and calculated based on a ratio of the standard error to the mean of actual yields (Mahul, Verma and Clarke, 2012). In the WBCIS (and the weather-based component of the mNAIS) thresholds are based on an actuarial analysis drawing on historical weather and crop data.

The thresholds for triggering support to counties in Kenya’s DCF are based around established drought phases. These are defined in terms of specific values for the various indicators used in the trigger mechanism. Thresholds for each of the indicators are determined in different ways. For example, thresholds for the Standardised Precipitation Index (SPI) (which measures rainfall deficit over a three-month period relative to the same period based on historical precipitation data) were based on a retrospective analysis of SPI trends in the Turkana county during the 2009-2011 drought (NDMA, 2014a). Thresholds for the Vegetation Condition Index (which uses satellite data on estimated forage density) are based on an analysis of VCI applied to the drought crisis in Turkana in 2008-2009. Thresholds for socioeconomic indicators are determined at the county level through deviations from long-run averages. These thresholds have then been mapped against the drought phases, providing quantitative measures against which it can be determined the extent to which a county is entering into a period of drought. For example, the ‘alert’ phase (from which a county may trigger a request for funding) is characterised by a three-month Standardised Precipitation Index of below -0.09 and an estimated rainfall measurement of less than 80% of the level that characterises the ‘normal’ drought phase (NDMA, 2014a).

The determination of thresholds in the ARC was explained earlier in section 3. Unlike insurance-based mechanisms where individuals are the policy-holders, in the ARC it is governments that choose their own thresholds (or attachment levels) depending on the level of risk they are willing to take on (or the amount they are willing to pay, as contracts with lower thresholds are more costly). One distinctive feature of the ARC compared to the other programmes is that it is specifically designed in order to help countries deal with rare drought events (once every five years or more) and so threshold levels are therefore set relatively high. This simply means that the mechanism is designed to deal with a different layer of shock and that additional shock response mechanisms may still be required for more frequent or localised shocks. One example of this complementarity is being developed in Kenya, where the HSNP will have its own index-based trigger for localised droughts and funding through the ARC will only be triggered if the drought is severe enough and affects enough counties to pass the ARC thresholds.

4.1.6 Policy response: trigger-policy response link and policy response plans

Programmes also vary depending on the degree of automaticity incorporated in the trigger-threshold policy response link. In Ethiopia’s RFM, trigger activation leads to the start of a decision-making process. To some extent, Kenya’s DCF shares some similarities with the RFM in this respect. The trigger itself must be initiated by a county steering group by making a request for funding when it believes it is in the late Alert or Alarm phase of a drought. The request must be accompanied by supporting information including an early warning bulletin, a county Action Plan and a budget.

²¹ Correspondence with key informant involved in the IBLIP.

Following this, requests must be approved in turn by the manager of the county National Drought Management Agency (NDMA), the DCF Drought Response and Contingency Planning Manager, the Director of NDMA Technical Services and the head of the NDMA. However, as mentioned before, there are clear criteria set out against all of the indicators used which help define when a county is in a particular phase. The approval process is supposed to take seven to ten days before funds are transferred to the county-level NDMA.

As for the other programmes under review - all of which have either just one or two indicators - the link between triggering and policy response is, according to programme design, more automatic: once a threshold is met, it leads to the activation of a pre-specified action.

Another useful distinction can also be made between indices that are used to (initially) trigger a financing response and indices used to more directly trigger a social protection response. Two examples of the former include the use of the WRSI in the ARC to trigger the disbursement of finances to a country, or the various indices used in the DCF in Kenya which trigger a financial disbursement to ASAL counties. By contrast, the NDVI used in Kenya's IBLI leads directly to the disbursement of an insurance payout to individual policy holders.

In terms of the planned social protection responses across all programmes, these may include the activation of new social protection instruments, the scaling-up or extension of existing initiatives to existing beneficiaries and/or to new beneficiaries or a combination of both. The initiation of new social protection activities occurs in all cases of the index-based insurance programmes and also in Kenya's DCF (which does not make insurance payouts but provides funds to implement activities as set out in county drought Contingency Plans). That is to say, these schemes do not necessarily build on existing social protection activities that operate in the absence of shocks. The planned response for the DCF has been outlined above, and for all of the insurance programmes it is relatively straightforward in that a financial payout is made to policy-holders in the case of the respective thresholds being exceeded.

The remaining programmes generally involve building on existing social protection programmes in some form or other. The specific response in Ethiopia's RFM depends on the district-level contingency plans, but in general it is supposed to involve an extension in the duration of PSNP transfers to existing beneficiaries and an expansion in the number of beneficiaries in PSNP operational areas.

Under the ARC, different countries have proposed quite different responses, though countries are encouraged to build upon existing initiatives, specifically to facilitate a timely response. In Malawi the planned response both builds on existing social protection programmes and involves the distribution of emergency food aid. With the pre-existing programmes it does not involve expanding the programme to new beneficiaries but instead increasing the value of the transfer (for the SCTP) and increasing the value *and* extending the payment for an additional month (for the PWSP). Mauritania's plan involves the provision of monthly food rations and a food-for-work programme using food coupons for able bodied individuals (or unconditional food coupon transfers for the vulnerable or those unable to work) both of which would replicate similar existing initiatives. Finally, in Kenya's ARC Operational Plan, it sets out three options either for scaling up the value of transfers to existing beneficiaries, expanding the number of beneficiaries at the existing transfer value or scaling up the value to existing beneficiaries *and* expanding the number of beneficiaries. The final decision is postponed until there is knowledge of the specific drought conditions, providing flexibility to governments to deal with any potential mismatch between needs identified through the index-based mechanism and actual need on the ground, channeling funding to where it is needed most.

The discussion above highlights an important link between the design of the index-based programme and coverage. More specifically, in the case of social insurance approaches, policy responses may be limited by low demand or participation in the insurance programme (e.g. due to costs or low levels of understanding around what can be complex products and programmes) (Gine, 2009). In the case of social assistance, the extent to which an index-based trigger programme will be able to provide an

adequate shock response will depend crucially on the targeting mechanism of the social assistance programme in place and specifically on its current coverage and its flexibility/ability to capture changes in people's well-being in a timely fashion (e.g. frequency of recertification, informational requirements etc., see Bastagli, 2014). This is discussed further in the next section on policy response in practice.

4.2 Index-based triggers: Activation and policy response in practice

Among the case studies reviewed below, all of the index-based trigger mechanisms have been activated, some on more than one occasion. Within the ARC, among members of the first insurance pool, thresholds were met in Niger, Senegal and Mauritania.

Where index-based programmes have been implemented, the available evidence highlights the ways in which index-based trigger components have contributed to the timely and adequate delivery of social protection and the features that have facilitated or acted as obstacles to such outcomes. For example, in Ethiopia, the RFM played a crucially important role in saving lives and was critical in helping Ethiopia broadly avoid the major drought that hit the region in 2011, while surrounding countries suffered famine (Gray and Asmare, 2012).²² At the same time, delays were experienced both in the triggering of the RFM and the transfer of funds to sub-federal level and final beneficiaries (Hobson, 2012). Delays in payouts have been experienced in other case study programmes too. For Mexico's SAC, while the original guidelines stipulated payouts would be delivered within three months after thresholds had been met, nearly 40% of surveyed farmers received payments between six and nine months after that (62% of farmers received payments between three and six months after the threshold had been met) (World Bank, 2013).

What are the factors that enabled index-based triggers to facilitate timely and adequate social protection response? The discussion is organised around the two main stages of index-based trigger response: first, trigger decision point and activation and, second, the delivery of social protection to beneficiaries or insured households.

In advance of reviewing the evidence, it is important to note that a key finding is that there appears to be fairly little in the way of formal evaluations of the triggering processes and index-based social protection responses. In some cases, such as for the ARC, this reflects the fact that trigger responses have only recently occurred and so there is limited information available.²³ In what follows, information is gathered from a combination of review of documents, key informant interviews and correspondence with key stakeholders involved in the design and delivery of the programmes.

As described at the end of the previous section, policy responses vary depending on the nature of the social protection programme reviewed. The activation of triggers in social safety net/social assistance type programmes may involve scaling-up the level of support or extending the duration of support to existing beneficiaries and/or expanding programme coverage to new beneficiaries. In the case of the social insurance cases reviewed, responses generally involve one-off payments to policy holders or those covered by the insurance mechanism.

4.2.1 Trigger decision and activation

The experience of the programmes reviewed here shows that the main factors which facilitated or hindered timely trigger decision points and activation include: access to adequate and timely data, clarity in the trigger process, and the presence of existing detailed plans for social protection responses.

²² Interview with key informant involved in the design of the RFM.

²³ All three countries where the ARC was triggered will be independently audited in order to learn lessons and improve responses and planning in the future.

Adequate and timely data

Evidence from a number of cases highlights the crucial importance of access to adequate and timely data. In the case of Ethiopia, delays in the triggering decision of its RFM in 2011 have been directly attributed to, among other factors, insufficient local early warning data to make a reliable estimate of beneficiary numbers (Gray and Asmare, 2012). This is echoed in a separate report which indicates that the assessment sheets used for the 2011 trigger did not generate sufficiently precise information on which to base a decision to trigger (Sandford, 2014). In practice, this should not have been a problem according to RFM guidelines as the trigger was also supposed to be based on an ex ante weather index-based component (LEAP) (Ashley, 2009). However, the LEAP was not used in either the 2011 or 2014 trigger. Instead, the decision to trigger in 2011 was reached mainly based on requests from regional governments who depended on regional early warning information (Hobson, 2012). The same thing happened in 2014.²⁴

According to a key informant, one of the reasons for the failure to use LEAP data seems to have been that the early warning system around which it was based was not adequately developed to support implementation according to the original design of the RFM. Lack of confidence by the government in using the data from the LEAP also played a role.²⁵ However, it was felt that the government may be coming around to the idea of using such data as an early predictor, and capacity building exercises have been taking place over the past few years to integrate the weather-based index into government systems, including the expansion of the index and related software to cover flood risk and drought risks faced by pastoralists. It was also mentioned that verification through field assessments was likely to remain an important tool for the time being.²⁶

In the case of Kenya's DCF, access to multiple sources of data, including satellite data, appears to have played a crucial part of avoiding triggering a response in cases where a trigger should not have been implemented. The use of satellite and weather station data in 2014 allowed the NDMA to reject requests that were made from counties based on socioeconomic data, where the drought situation in fact turned out to be in the 'normal' or near normal phase upon inspection of other data sources.²⁷

In the case of the DCF, it was also noted that in 2014 the socioeconomic data used as part of the overall drought index were of poor quality in some counties in which case in practice the trigger relied more on remote sensor data, complemented by qualitative information.²⁸ This provides a potential caution relating to the challenges of ensuring quality in socioeconomic data in index-based mechanisms, which may be prone to particular errors and manipulation. However, it is important to note that this does not mean that other types of data which are collected automatically are also not prone to error or manipulation.

Concerns of data quality and manipulation associated with index-based triggers based on data collected automatically arose in the case of India's WBCIS, for example, where the present density of weather stations is insufficient to provide accurate data in all areas and, even among the weather stations available, there have been reports of tampering with equipment to manipulate weather readings (Ministry of Agriculture, 2014). There may also be faults in technology used to collect data. In 2006, a trigger was activated in Mexico's SAC and an indemnity paid to a particular area based on readings from the local weather station despite no damage being found to have occurred in the field. In the same year in Michoacán State, the threshold was not met despite damage being present in the field (Hazell et al., 2010). Section 4.2.2 discusses the implication of data quality and manipulation for programme delivery and impact.

Clarity of thresholds, the trigger process and policy response

While most programmes involve fairly clear standardised procedures from the point of a trigger being set off through to a defined social protection response being delivered, some in practice involve

²⁴ Interview with key informant involved as a policy specialist on the RFM.

²⁵ Correspondence with key informant involved as a policy specialist on the RFM.

²⁶ Correspondence with key informant involved as a policy specialist on the RFM.

²⁷ Correspondence with key informant from the ASAL Drought Management Project.

²⁸ Correspondence with key informant from the ASAL Drought Management Project.

greater scope for flexibility and discussion by committee. While this may on the one hand permit a more tailored and appropriate response, at the same time it can also lead to delays and potential scope for political interference.

In the case of Kenya's DCF and Ethiopia's RFM, thresholds appear somewhat more flexible in that the final decision to trigger a response was made by committee following consideration of the available evidence. The rationale given for this approach in the DCF was that it is not always easy to establish specific thresholds as some indicators are influenced by multiple factors and should be analysed together with other drought indicators (quantitative and qualitative) to better interpret a particular drought situation and what drought phase it corresponds to.²⁹ It is also argued that historical datasets are sometimes insufficient to establish reliable thresholds, meaning that having some flexibility to trigger even when thresholds are not met can be desirable (NDMA, 2014a). However, in the case of Ethiopia's RFM, this flexibility and lack of clarity around having standardised procedures appears to have led to some delays in the triggering process. For example, in 2012 the RFM was triggered but then abandoned because there was confusion over whether the RFM could be used again due to previous limits that had been set out in the guidelines over how many times it could be triggered within a particular period. Although these guidelines were since changed, they had not been updated in the official documentation, which led to confusion, and so an alternative financing mechanism was used, causing some delay (Gray and Asmare, 2012).

Also, the RFM was originally developed to ensure access to dedicated funds in the face of a climate-related emergency when previous contingency funds are exhausted. However, in 2011, unspent contingency funds at the regional level were cited as part of the cause of some delay in the trigger mechanism (Gray and Asmare, 2012). This highlights a need for clarity over the conditions under which different sources of financing are to be drawn on.

The experience of Ethiopia's RFM highlights the importance of detailed plans setting out exactly what will take place, when and where in the event of a shock. References point to both the critical role that contingency plans played in ensuring timely response, for instance compared with humanitarian response (e.g. Hobson, 2012), and to delays in the triggering decision of 2011 linked to weak contingency plans for RFM (Gray and Asmare, 2012).

4.2.2 Delivery of social protection

The timely and appropriate delivery of adequate resources to beneficiaries/insured individuals depend on the following factors: indicators and data, programme coverage and targeting; clarity of guidelines and procedures; payment levels; pre-positioning and transmission of finance and procurement issues; and infrastructure and administrative capacity.

Indicators and data

The type of indicator used and data requirements have implications for the timely and adequate delivery of index-based trigger-activated social protection. One key concern discussed above is that of basis risk, which arises from the weak correlation between the losses identified through the index and people's actual losses incurred from the shock. This risk depends on the suitability of the underlying variable or indicator itself. It can also arise from low quality and irregular information provision.

In India, for programmes relying on crop yield indexes, a combination of indicator and data factors led to delays in insurance payouts, including 'non-submission of yield data, based on [crop cutting exercises] and the differences arising because of area discrepancy' (Ministry of Agriculture, 2014: 59). A partial solution suggested was the use of a weather-based index alongside the crop yield index as a means of providing an early part payout in the event of a clear weather shock as gathering data using weather stations takes less time. However, this only provides a part payment and introduces

²⁹ Interview with key informant from the ASAL Drought Management Project.

potential complications in the case where shocks do not end up materialising as predicted by the weather indices.

In the case of India's weather-based crop insurance, some evidence of basis risk was reported as a result of low quality equipment but also from weather stations being tampered with. In the 2010/11 *Rabi* season one study cites reports of insured farmers placing ice cubes around temperature sensors of automatic weather stations to trigger payments (Clarke et al., 2012). The extent to which this took place and actually led to payouts remains unclear. However, it does highlight the fact that even supposedly automatic technology may be prone to tampering.

In Kenya's DCF, as of September 2014, a total of 10 counties had either received funding or had budgets approved ready for disbursement (NDMA, 2014c). This was achieved using a combination of data sources – as discussed above – in part to address the problem of inadequate weather station data which cannot be extrapolated across large areas. For this reason, adequate coverage and response is being pursued by combining actual rainfall estimates with rainfall estimate data from satellite data.³⁰

In Mexico's SAC, as was mentioned above, in a limited number of instances from the early years of the programme, coverage was both not provided when it appears it should have been and provided when it should not have been. This appears to be due to problems with the weather stations used. However, as has also been mentioned, in a 2009 evaluation nearly all of the small-scale farmers surveyed believed that no eligible affected farmers in their locality had not received a payout when they should have (World Bank, 2013), suggesting that the indicators and data used have come to provide reasonable coverage to those that needed it.

Programme coverage and targeting

Appropriate coverage of the population in need in the event of a shock is determined both by the factors that influence whether an index-based trigger programme is activated in the first place (as discussed above) and by the population coverage of the social protection programme itself.

In the case of social assistance programmes that rely on targeting mechanisms that identify beneficiaries, the extent to which coverage is adequate is determined by the beneficiary identification rules, informational requirements and recertification or verification processes. In the case of social insurance programmes, similarly, the rules of policy participation and the costs associated with participation influence the demand for insurance and programme participation. A distinction can also be made between those insurance programmes where the onus is upon the individual to obtain insurance and those where the decision over insurance coverage is down to the government (e.g. as in Mexico's SAC).

In social assistance, the reliance on existing targeting mechanisms with limited flexibility and shock responsiveness features in some cases has led to shock response being restricted to existing programme beneficiaries, with households affected by a shock but that were not previous beneficiaries being excluded from social protection support. In its initial operational plan, Malawi chose to opt for using ARC funds to scale up (and extend in the case of the PWSP) transfers to existing beneficiaries rather than involve new caseloads, partly as a result of the added administrative burden of identifying new beneficiaries (Government of Malawi, 2014).

In the case of Ethiopia's PSNP, the fact that during the 2011 trigger, 70% of those who benefited from the RFM were existing PSNP beneficiaries and the remainder were from the same areas, may well have been one reason behind the response being considered as timely in comparison to a parallel humanitarian response (Hobson, 2012).³¹ However, in the 2011 response, the RFM was only available for districts covered by the PSNP and did not cover pastoralists: policy response did not include all

³⁰ Correspondence with key informant from the ASAL Drought Management Project.

³¹ In 2011 the RFM provided support to 6.5 million existing PSNP beneficiaries and an additional 3.1 million living in districts where the PSNP was in operation (Gray and Asmare, 2012). To identify households, the Disaster Risk Management and Food Security Sector established a list of the districts that were severely affected by drought, using seasonal assessments, rapid assessments and monthly food security monitoring (Gray and Asmare, 2012).

of those who were affected by drought. Non-PSNP beneficiary access to the RFM was restricted, requiring support to be provided through humanitarian intervention (Gray and Asmare, 2012). Following the 2014 trigger, around 2.7 million households were identified as being affected by inadequate rainfall and other hazards, out of which 1.4 million were residing in PSNP districts and eligible for support under the RFM.³² The remainder were outside of the RFM's scope and supported through alternative humanitarian mechanisms.

This highlights one of the main challenges of social assistance programmes that rely on targeting. While such policies may target poor households, it is not clear that it will be the same households that are in greatest need when faced with a given covariate shock. For example, in Kenya, in the case of droughts in pastoral areas, rather than the poorest households it may be slightly wealthier households who depend on livestock for their livelihoods that are equally or most in need of support during a drought.³³ This is summarised by McCord, who points out that 'the target group in a humanitarian emergency may not necessarily follow the same geographical targeting as established in social protection programmes'. While 'it is not particularly feasible to carry out new targeting on a large scale in the context of an emergency' (McCord, 2013), it is possible to design social protection targeting mechanisms that are flexible, adaptable and responsive to shocks (for details see Bastagli, 2014).

In Mexico's SAC, eligible farmers are identified based upon pre-existing lists of low-income small-scale producers held by state governments (Hazell et al., 2010). A 2009 review of Mexico's SAC reveals that it has been a highly effective insurance-based approach in terms of reaching those in need of assistance following a weather-related shock: 100% of the surveyed beneficiaries were within the 2009 eligibility criteria of cultivating less than 20 hectares of rain-fed crops and 97% of those surveyed believed that no eligible affected farmers in their locality had not received a payout (World Bank, 2013).

In the predecessor of Mongolia's GCC – the Disaster Risk Product – it was noted by a member of project staff that coverage of the DRP (effectively a non-commercial element of the insurance) was low due to a lack of incentives among insurance agents to encourage herders to pay the small fee required in order to be covered. This suggests that additional information sharing and educational activities are required to boost demand for government-backed insurance products, especially where there is little incentive for the private sector to do so. The problem of low demand of insurance products was also recognised in the case of Kenya's IBLI, where low levels of literacy were seen to be a key obstacle to further coverage.³⁴

In India, anticipating the problem of low levels of insurance, it has been made compulsory for farmers taking out loans to purchase crop insurance for specified crops. However, it has been noted in a report by the Ministry of Agriculture that even this has its limits as 'banks very often do not adhere to the scheme. Very often, they do not enforce payment of premium by loanee farmers, particularly when weather conditions are favourable' (Ministry of Agriculture, 2014, p. 55).

Among all of the insurance programmes which depend on individuals to purchase policies (rather than central or regional governments as in the case of the SAC or ARC), it seems that limitations in demand remains a key problem undermining coverage. Although Mongolia's IBLIP has outperformed its own expectations, coverage remained low at around 10% of herders within participating provinces between 2006/07 and 2010/11 (Luxbacher and Goodland, 2011). While the IBLIP had previously covered all herders in the operational areas for losses above the limit of the commercial insurance component (through the DRP), this had to be scrapped from 2009 as the programme grew, and was replaced with the GCC which only covers those with commercial insurance, as it would have otherwise opened the Government of Mongolia up to considerable financial exposure (Luxbacher and Goodland, 2011).

³² Correspondence with key informant involved as a policy specialist on the RFM.

³³ Interview with key informant involved in the HSNP.

³⁴ Correspondence with key informant from ILRI.

Clarity of guidelines and procedures

In Ethiopia, following the 2011 triggering of the RFM, the official guidelines were not always easy to understand or follow, leading to confusion and lack of understanding about roles and responsibilities. According to a report drawing on evidence from key informants, there have been some (potentially isolated) cases where there were exclusions from eligibility for the RFM because of prior PSNP beneficiary status (Gray and Asmare, 2012). Misunderstandings over which populations are covered by regular PSNP support, contingency budgets and those who should be included under an alternative humanitarian arrangement have also been noted by key stakeholders involved in the programme (Sandford, 2014).

A related factor that contributed to delays in the distribution of resources in response to the 2014 triggering of the RFM in Ethiopia, was the decision to move away from the transfer of cash to the transfer of food. The timeliness of response was further delayed by the decision to make a change in the type of transfer.³⁵

Officials and representatives of development partners have suggested that RFM guidelines need to be simplified and a quick reference guide created, with both being translated into local languages in order to make them accessible (Gray and Asmare, 2012).

Transfer or payout levels

A further factor important in ensuring an adequate social protection response concerns payment levels. In the case of Mongolia's IBLIP, for instance, despite relatively strong growth in the purchase of commercial insurance (which is now required in order to benefit from the government's GCC), and despite coverage being relatively reasonable as a proportion of the total herder population, those with policies have typically purchased policies that cover only a fraction of the estimated value of their herd, typically 30% (Luxbacher and Goodland, 2011). This implies that payout levels are likely to be insufficient in the case of a shock and signals the need for additional support and awareness campaigns around risk management.

In the case of an evaluation of Mexico's CADENA programme by the University of Chapingo, it was found that 60% of those interviewed indicated the payouts represented less than one-quarter of their investment costs (World Bank, 2013).

In Ethiopia's PSNP, in 2011 the RFM provided an extension in the existing PSNP payment levels to 6.5 million existing beneficiary households for an additional two to three months and the same levels to 3.1 million non-beneficiaries from PSNP areas for up to three months (Gray and Asmare, 2012). On paper this amount would have been sufficient to bridge the food gap until the following harvest (Gray and Asmare, 2012). Levels of support were determined by the Early Warning Response Directorate and Food Security Coordination Directorate based on a World Food Programme food security classification analysis (Gray and Asmare, 2012). In 2014, 2.7 million people were identified as having been affected by inadequate rainfall and other hazards (e.g. floods and hailstorms), out of which 1.4 million were residing in PSNP districts. The decision was made to provide four months of transfers to households in PSNP districts at a level that was on paper sufficient to meet a household's nutritional requirements – 15 kg of grains and 4 kg of pulses per person per month – similar to the transfers provided through humanitarian assistance.³⁶ However, there remains limited evidence of what payout levels actually received ended up being, which is an area of interest given previous research that has suggested regular PSNP transfers have been prone to be shared among households (Slater & Bhuvanendra, 2013).

³⁵ Correspondence with key informant involved as a policy specialist on the RFM.

³⁶ Correspondence with key informant involved as a policy specialist on the RFM.

Pre-positioning and transmission of finance and procurement issues

The pre-positioning of finance is one of the key elements of index-based trigger mechanisms that allows for a timely response to covariate shocks. The very concept of an index-based mechanism is that, providing a threshold is met, certain pre-defined actions are then set in motion, meaning that a dedicated source of finance needs to be already in place.

In the case of Ethiopia's PSNP, the pre-positioning of finance was explicitly mentioned as a crucial factor underpinning the ability of the RFM to respond to a major drought in 2011 in a more timely fashion than a parallel humanitarian response, the delivery of which depended crucially upon securing funding through appeals (Hobson, 2012). Hobson (2012) found that the RFM offered a favourable response time compared to a parallel humanitarian response in 2011: it took six weeks from the original request to trigger the RFM until resources were disbursed from the federal level, while the humanitarian response appeared to suffer from being reliant on resources being made available through a humanitarian appeal.

In Mexico, from 2004, greater financial sustainability was achieved through transferring risk to the international market through a commercial reinsurer, Partner Re.³⁷ This has presented a major opportunity for the Mexican government to be able to ensure the sustainable finance of social insurance programmes such as SAC. Mongolia's IBLIP too has also benefitted from accessing international reinsurance markets to help cover the government's exposure to payouts under the GCC. The ARC too depends on being able to access such markets, allowing ARC Ltd. to remain exposed to the level of risk it covers and thereby provide the level of coverage it does.

However, even if finances are centrally available, there may be delays in disbursing resources to end beneficiaries. In Ethiopia, where finances from federal to district level reportedly arrived late when the PSNP was triggered in 2011, leading some regions to draw on other resources in the meantime (Sandford, 2014). In the case of the ARC, clear guidelines have been established for transmission of funds to countries where a payout is made, thereby providing a measure against which the ARC programme can be held accountable.³⁸

In the case of Kenya's DCF, there is a further layer of policy action which creates scope for delays in support being provided to end beneficiaries as county operational plans typically involve the purchase of a wide range of inputs to deal with emerging drought. One of the major challenges that slows down disbursement relates to the considerable bureaucracy involved.³⁹

Infrastructure and administrative capacity

The ability to draw on existing infrastructure and systems is one of the key theoretical advantages to an index-based trigger being linked to existing social protection mechanisms (Ashley, 2009). However, in practice infrastructure can still pose major challenges for the timely delivery of a shock response. For example, in the scaling up of Ethiopia's PSNP in 2011, the timely delivery of transfers was in some cases dependent upon the proximity of cash and food points to local governments, and the accessibility of final delivery points in the rainy season (Gray and Asmare, 2012).

Poor infrastructure has also been highlighted as one of the major challenges in Kenya's IBLI, both in terms of holding back delivery but also increasing the cost of delivering the insurance (Wandera and Mude, 2010). In most of the target areas, inadequate mobile phone coverage has meant that payments have been made manually. This means that timely delivery of protection depends on access by road, which increases the time and cost of delivering the insurance product. Where mobile phone coverage is better, insurance companies have been taking advantage of the Mpesa mobile money transfer

³⁷ Interview with independent consultant from Mexico.

³⁸ Interview with member of the ARC Secretariat.

³⁹ Correspondence with key informant from the ASAL Drought Management Project.

platform, which enables a much faster response.⁴⁰ The extent to which this infrastructure can be developed further in the future may critically determine the success of the IBLI. Even within the potentially limited operational areas of existing social protection schemes, there may be challenges in reaching all households. In the case of Kenya's HSNP too, anticipated delivery challenges are linked to infrastructure and management limitations and arise from the fact that many households around border areas were yet to acquire a national identification card, which is a requirement in order to own a bank card and therefore become an HSNP beneficiary.⁴¹

Finally, the implementation and delivery of index-based trigger mechanisms require adequate administrative capacity. All the case studies highlight how the high administrative requirements are critical to ensuring these tools function as intended. In the case of India's crop insurance programmes, a report by the Ministry of Agriculture observes: 'The design of crop insurance schemes involves the participation of several agencies, such as insurance companies, financial institutions and Central and State government agencies ... Unless each agency fulfils its roles and obligations in a timely and systematic manner, there is bound to be delay, as it happens again and again at many places' (Ministry of Agriculture, 2014: 59).⁴² In Ethiopia, a detailed report on the functioning of the implementation of the RFM in 2011 found that training for the management of the RFM process was inadequate and linked to late delivery of resources at the district level (Gray and Asmare, 2012). In Kenya's DCF, according to one key informant, although the trigger and delivery of support was believed to be adequate and broadly in line with the design of the programme, 'in general there is much need to improve drought preparedness at all levels'.⁴³

⁴⁰ Correspondence with key informant from ILRI.

⁴¹ Interview with key informant involved in the HSNP.

⁴² Emphasis added.

⁴³ Correspondence with key informant from the ASAL Drought Management Project.

5 Policy implications and conclusion

Motivations for relying on index-based triggers in social protection programmes include their potential for promoting timely and adequate shock response. This paper has identified the key design and implementation parameters that influence the effectiveness of index-based triggers in social protection shock response and analysed the experience of ten social protection programmes that include such mechanisms. The following paragraphs summarise the main policy implications that arise from the study.

One of the features that influence policy response timeliness is the number of indicators and data sources/requirements underlying the trigger mechanism. In some programmes, the decision to rely on one or a limited number of indicators for the trigger index is motivated precisely by the reason to facilitate timely response. This was a key rationale behind the decision in current plans for an independent index-based trigger mechanism in scaling up Kenya's HSNP to rely on a simple single indicator.

A higher number of indicators and higher data requirements may lengthen the time of response as the coordination of multiple data sources and providers/agencies can prove to be administratively complex and increase the risk of data 'gaps' as a result of which there may be delays in the activation of a trigger and in delivery on the ground. However, at the same time, the reliance on a higher number of indicators can reduce basis risk. Efforts to complement an index – for instance by having a double-trigger system – can help to ensure a closer correlation between an index-based trigger mechanism and need.

The degree of automatism with which data are collected for a specific indicator also matter to the issue of timeliness. A potential benefit of indicators that rely on technology rather than on information collected manually is that the first can be less time consuming. Moreover, the reliance on manual data collection is commonly associated with higher risks of error and manipulation. Although the evidence shows that these risks are present in the case of automated technologies too, the latter represent an opportunity to reduce administration/data collection costs and opportunities for manipulation, thus freeing up resources and helping to secure additional programme financing from stakeholders who are keen to minimise moral hazard and adverse selection problems. For instance, the rationale for using weather station data in Mexico's SAC was its potential de-politicisation of resource distribution. The same reasoning underpins recent discussions of the future HSNP scale-up mechanisms involving the use of satellite data and its potential benefit in terms of securing financial support.

Another key distinction is between indicators that by design allow for an ex ante (predictive) response to shocks and those that can only allow for an ex post response. Indicators such as livestock mortality and crop yields allow for a policy response once a shock has occurred and the threshold level of the outcome variable of interest is reached. In contrast, triggers set against measures that capture signs of the early stages of a shock could facilitate an earlier response. For example, Kenya's DCF is designed to capture drought phases, including when a county is entering a period of drought. In practice,

whether an index-based trigger mechanism permits early response depends on both the type of indicator and the level at which the trigger threshold is set.

The type of indicator also has implications for basis risk. Indicators that capture directly observable outcomes (e.g. actual rainfall, fodder availability, crop yields) may offer lower basis risk than those that rely on proxies (e.g. estimated rainfall based on cloud coverage, estimated vegetation coverage as a proxy for fodder availability). The reliance on proxies adds scope for error to the reliance on index-based mechanisms that already crucially depend on data quality and on the quality of statistical modelling used to estimate the relationship between the relevant shock and the outcome variable of interest.

Basis risk is also determined by the level of aggregation at which the indicator is measured and this in turn is in part determined by available infrastructure and cost considerations. The rationale for a higher level of aggregation beyond the individual/household level includes reduction in administrative and management costs and speed of response. At the same time, higher levels of aggregation may be associated with lower capacity to capture localised shocks, potentially leading to higher basis risk. This concern is weakened in the case of mechanisms that target risk aggregating governments, rather than households. For example, in the case of the ARC, designed to payout in the event of large shocks, aggregating risk and looking at the bigger picture facilitates the management of risk and the financing of response since it is easier to model large-scale national drought than small, localised ones. Its government clients are potentially better placed than individuals to handle potential mismatches between payout and need.

The case studies shed light on the range of policy design options that have been used to address the trade-offs linked with the number and type of underlying indicators and data. For example, the decision in India's mNAIS to rely on both a weather-based index and a crop yield index aims to address the potential limitations associated with the two types of indexes while exploiting their potential advantages.

The case studies also indicate the ways in which, in practice, the reliance on independently observable indicators and data to activate and expand social protection has helped to ensure timely and effective social protection response. In Kenya's DCF, the availability of satellite data appears to have proven crucial in ensuring an appropriate response in 2014 when faced with low quality manually collected socioeconomic data in some counties. The experience reviewed also points to how, in some cases, challenges to the timely availability of reliable data for the monitoring of underlying indicators led to delays in trigger activation and/or to the reliance on alternative indicators and data sources to those outlined by official programme regulation (e.g. in Ethiopia's PSNP). The strengthening of data collection methods relying on new technologies and related early warning systems offer a promising step forward.

The timeliness of policy response once a trigger is met also hinges critically on the agreement of clear and detailed plans outlining planned policy response. These can guarantee varying degrees of automation to policy response. At one end, some programmes allow for flexibility and room for discretion by both adopting variable trigger thresholds and outlining a process of deliberation by committee on whether a trigger is met and on appropriate response. At the other end, policies include fixed trigger thresholds that by design are linked to a clearly defined response.

Once a trigger is met and/or activation is agreed on, one of the key determinants of adequate policy response is policy coverage and associated social protection targeting mechanisms. Policies that display low coverage and/or rigid targeting systems limit the potential impact of index-based trigger social protection instruments. In the case of social insurance, a particular concern arises from potential low coverage associated with high premiums and low demand for insurance products leading to the exclusion of vulnerable groups. One partial solution to this is the subsidisation of premium (as in the case of India), though even then more may need to be done to ensure coverage. In the case of targeted social assistance, rigid targeting systems that narrowly cover particular population sub-groups or geographic areas and that do not capture changes in people's circumstances with sufficient frequency

risk limiting shock response to existing beneficiaries. For such programmes to provide effective shock response, adequate coverage and flexible targeting mechanisms are critical.

Effectiveness also depends critically on adequate transfer levels and these in turn are largely determined by appropriate funding resources. Contingency financing plans in the case of social assistance and reinsurance in social insurance have proved to be essential to permitting social protection index-based trigger mechanisms to function as intended. In the same vein, adequate infrastructure and administrative capacity are key requirements.

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