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Building climate resilience through social protection in Brazil: the *Garantia Safra* public climate risk insurance programme

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More frequent and severe extreme climate events not only endanger lives all around the world, they also threaten previous development progress and future development opportunities. While climate risks are on the rise, a growing variety of tools aims to reduce the impact on poor and vulnerable people. Among those tools, social protection stands out as a proven set of instruments when it comes to reducing risks in a context of poverty and vulnerability. However, social protection instruments are still to prove their role in building resilience against extreme climate. Evidence from the *Garantia Safra* programme, a public index-based climate risk insurance scheme in Brazil, suggests that uncovering social protection's potential to build resilience still requires some work, especially when it comes to long-term solutions. The programme struggles to alleviate smallholders' acute suffering after an extreme climate event, and it hardly enables them to build their resilience in the long term. The results suggest a context-based assessment of the efficiency and effectiveness of public climate risk insurance schemes.

1 Introduction

Climate risks, exacerbated by climate change, disproportionately affect poor and vulnerable citizens in the global South. When left unprotected, they are likely to fall deeper into poverty (Hallegatte et al. 2016). Rural populations engaged in smallholder agriculture are particularly affected as climate extremes become more frequent and intense. Due to their dependency on the climate, extreme events such as heavy rains and droughts have a long-term impact on their assets, income and food security, as well as on national food security (FAO 2019). Therefore, it is particularly crucial to enable the poorest and most vulnerable population groups to better prepare for, respond to and recover from climate shocks and stresses—in short, to enhance their climate resilience.

Resilience is increasingly seen as being key to softening the impacts of extreme climate for individuals, households and communities living in risk-prone areas. To do so, resilience thinking explicitly links disaster risk and climate change considerations to sectors that tackle poverty and vulnerability (Bené et al. 2012). By tackling the root causes of poverty and vulnerability, social protection offers the potential to enhance resilience against climate extremes in the short as well as the long term. However, social protection's actual contribution to climate resilience has not been studied conclusively, especially when it comes to long-term impacts. In practice, social protection tools such as cash transfers are mostly used during short-term humanitarian interventions in the aftermath of climate shocks (see shock-responsive social protection)¹ (Solórzano 2016).

In contrast to the dominant short-term perspective, this Policy Research Brief aims to shed light on longer-term resilience and social protection's contribution to it. It focuses on the case of *Garantia Safra*, a public index-based climate risk insurance for poor and vulnerable smallholder farmers in Brazil. Based on a survey conducted by Brazilian authorities and the World Bank in 2016, this Policy Research Brief explores *Garantia Safra*'s potential to build the resilience—more precisely, the adaptive capacity²—of smallholders in the semi-arid north-eastern state of Ceará. *Garantia Safra* is a case of interest because of its size, longevity and its rare public character. This Policy Research Brief contributes to the research about index-based risk insurance, especially taking into account a longer-term as well as a social protection perspective, by providing an example of the rather underrepresented tax-funded schemes that are embedded in a wider social protection strategy. Although social protection programmes have quite some tradition in Latin America and the Caribbean, empirically little is known about their impact on climate resilience (Cecchini et al. 2015; Solórzano and Cárdenes 2019).

2 Social protection's contribution to resilience in theory and practice

Linking social protection to resilience reflects a political shift in the narratives about climate extremes. In 2015 the Sendai Framework for Disaster Risk Reduction and the Paris Agreement reaffirmed what was already stated in the Hyogo Framework for Action in 2005: to promote sustainable development, it is crucial to manage risks before extreme events occur, rather than coping with their impact in the aftermath (UNDRR 2015). As the resilience concept considers the impact of climate extremes not only on

the human but also on the ecological level, it moved into the centre of discussion in areas such as disaster risk management and climate change adaptation. It is a core concept to interlink different sectors as well as different time perspectives (Solórzano 2016).

Against this background, several conceptual frameworks³ have acknowledged social protection's potential to build resilience in the context of climate change. Most notably, adaptive social protection (see Davies et al. 2009) underlines the need to integrate social protection into disaster risk management and climate change adaptation considerations, as all sectors share a common objective and target group. By providing a protective as well as a preventive function,⁴ social protection tools can facilitate the shift from merely reactive protection responses to proactive prevention measures. The assumption is that only by being combined can both elements build long-term resilience by offering prevention before extreme climate events occur and providing protection afterwards. The perspective on adaptive capacity discussed here focuses on this interplay and underlines that resilience refers not only to people's ability to cope with climate shocks *ad hoc* but also their ability to adapt to changing climate patterns in the long term (Bené et al. 2012).

Apart from the conceptual angle, there is little scientific evidence about social protection's actual role in building long-term resilience. While social protection is intrinsically linked to shock management throughout human life cycles and has proven its role in reducing poverty and vulnerability, few studies address its contribution to climate resilience in the long term. Evidence, however, is growing: some studies cover the long-term effects of cash transfer programmes (see Coirolo et al. 2013; Heltberg et al. 2009; Solórzano 2016), public works programmes (see Adam 2015; Beazley et al. 2016a; Bené et al. 2012) and integrated programmes (see Knippenberg and Hoddinott 2017; Oxfam 2017).

3 The role of index-based insurance schemes in building resilience

For smallholder farmers around the world, dealing with climate variability is not a new phenomenon; however, climate change and land degradation increase their exposure and vulnerability to climate extremes. When a shock hits, both their livelihood and their food security are at stake (FAO 2019).

In recent years, index-based climate risk insurance has been advocated as an innovative tool to facilitate resilience to climate shocks, especially for smallholders. As a traditional tool for risk management and for social protection, insurance can benefit poor and vulnerable smallholder farmers living with elevated climate risks such as droughts or heavy rains (Hazell et al. 2010). Within index-based schemes, crop losses are no longer assessed individually but collectively for all farmers within a predefined area (e.g. municipalities). Indices, based on weather parameters such as rainfall levels, are used to determine losses in case of an extreme climate event. Payouts occur when a certain threshold of estimated crop losses is reached. This approach, besides being cost-effective, reduces phenomena prevalent in traditional insurance schemes such as moral hazard whereby insured farmers take excessive risks or declare false losses (Carter et al. 2018).

Index-based insurance can enhance resilience not only to current shocks but also to future shocks by displaying a protective as well as a preventive function. Insurance schemes protect people and livelihoods by guaranteeing relief in the aftermath of extreme climate events, similar to emergency support. The insurance payout might prevent households from relying on negative coping mechanisms after shocks, such as reducing food consumption or selling productive assets (De Janvry et al. 2016). Additionally, insurance incentivises prevention based on the assumption that it provides a sense of security for smallholders. A feeling of security might have a positive impact on production by encouraging positive risk-taking that leads to activities with more profitable returns (Jensen et al. 2015). It might also affect human capital development positively by encouraging investments in education, training and health, including by not reducing food intake in anticipation of a bad harvest. Together, both functions can enable smallholders to adapt to changing climate patterns in the long term (Jones and Tanner 2017).

4 *Garantia Safra* as a public index-based climate risk insurance

In 2003, Brazil became one of the first countries in the world to establish a tax-funded, State-run index insurance scheme. Contrary to most index insurance schemes, *Garantia Safra* is one of the government's long-standing flagship programmes, having experienced significant growth and covering almost 1 million farmers at the time of the study (World Bank 2016).

Garantia Safra focuses on the relief of smallholders after shocks in drought-prone regions, most notably in the states of the Northeast region of Brazil. Working as an income guarantee scheme, it represents a crucial instrument within the region's social protection strategy. The study area, the state of Ceará, located in this region, is facing complex development challenges: Brazil's north-eastern states show the highest incidence and depth of poverty in the country. Furthermore, they have experienced more frequent and severe droughts as well as heavy rains during the last decade and will continue to be highly exposed (Gaiger Silveira et al. 2016; IPCC 2012).

Garantia Safra's target group consists of smallholder farmers registered as family farmers.⁵ Family farmers eligible for the programme have a monthly family income of no more than 1.5 times the minimum wage (around BRL800 or USD208) and a cultivation area between 0.6 and 5 hectares. Only farmers who cultivate traditional crops such as maize, beans, cassava, cotton and rice may be enrolled. Smallholders must register for the programme in their municipality each year. *Garantia Safra*'s financial responsibility is shared among the farmers themselves, the municipal administrations, the federal states and the federal government. The share is lowest for the smallholders, who contribute only 2 per cent of the insured value. In the 2015/2016 programme term discussed here, the farmers' contributions accounted for BRL17 (USD4.5), while the total indemnification rate in case of a drought was BRL850 (USD229). In case of droughts or heavy rains, agriculture extension officers visit randomly selected fields and assess whether crop losses exceed 50 per cent. Payouts occur if the index in the respective municipality is reached. Although the National Meteorological Institute has developed an agrometeorological model to calculate crop losses (the so-called Water Requirement

Satisfaction Index), the index still relies on the randomly assigned field assessments, due to the lack of weather stations and historical weather data (World Bank 2017).

For the analysis, *Garantia Safra*'s impacts on adaptive capacity were examined via secondary data analysis. Based on the 2016 World Bank survey, treatment effects comparing *Garantia Safra* beneficiaries to a control group (a total of 4,813 smallholder farmers) were examined. The survey covered the time-frame before and after the drought season, enabling the analysis of both the preventive and the protective functions. Adaptive capacity, as the dependent variable, was operationalised by the following proxy indicators: a) increased investments in higher-return activities before and after a shock (including risk-taking and productive investments); b) increased investments in human capital before and after a shock (including food security and training on climate change adaptation); and c) the absence of emigration strategies before and after a shock (reflecting smallholders' ability to withstand adverse climate conditions).

5 *Garantia Safra's performance on resilience indicators*

The analysis found little proof that *Garantia Safra* contributed notably to the adaptive capacity of its beneficiaries. Although the existence of a protective function after the drought was partly confirmed by comparing beneficiaries in municipalities with and without a payout, this effect could not hold when comparing beneficiaries to non-beneficiaries in the same municipalities. Additionally, the preventive function before the drought season was absent, as beneficiaries tended to invest less in production and human capital than non-beneficiaries. Exceptions to this negative trend could only be found in two cases: before and after the drought beneficiaries were less likely to emigrate—an outcome that is considered positive following the programme logic, as farmers were able to withstand adverse climate conditions and continued farming. Furthermore, beneficiaries tended to participate more often in complementary agricultural assistance programmes such as *Hora de Plantar*, a local public seed programme in Ceará that provides subsidised seeds to smallholder farmers (Ematerce 2018). This behaviour might suggest that *Garantia Safra* successfully established links to additional programmes that possibly further strengthen adaptive capacity.

These sobering results stand in contrast to previous evidence on climate risk insurance. Most studies confirm the existence of the protective function (e.g. Dercon 1996; Janvry et al. 2016; Janzen and Carter 2013), whereas evidence for the preventive element is mixed (e.g. Karlan et al. 2012; Elabed and Carter 2014; Cole et al. 2014; Panda 2013; Mobarak and Rosenzweig 2013).

Garantia Safra's limited performance—particularly on the prevention side—might indicate difficulties in the areas of trust, incentives and economic preconditions. When farmers do not believe that the index insurance payout will cover their losses, they do not experience the assumed sense of security. Factors such as in opaque indices and unreliable, irregular or late payout mechanisms add to distrust (Hellmuth et al. 2009). In addition, the scheme might disincentivise investments in production and human capital in some cases. This topic is, however, rarely covered in the climate risk insurance literature, as it is widely assumed that indices avoid disincentives by providing the same economic incentives to all farmers (Hazell et al. 2010).

This conclusion, however, may not hold in the context of frequent and severe droughts. In 2016, 16 out of 20 municipalities in Ceará received a payout. Therefore, enrolled farmers, regardless of their agricultural performance, have a good chance of benefitting from it. Low enrolment costs due to high subsidisation may act as a reinforcing factor. Another possible explanatory factor for limited programme performance might be that beneficiaries' household income before the payout is too small to invest in either production or human capital as prevention measures. The analysis suggests the existence of an income threshold above which programme participation leads to better results. Therefore, lifting extremely poor households to a certain income level might increase positive programme effects—an assumption that is backed up by previous studies (see Kovacevic and Pflug 2010).

Apart from *Garantia Safra*'s performance, the analysis revealed insights about possible trade-offs between building resilience in the short and the long term. This is emphasised by *Garantia Safra*'s success in preventing emigration from the farms: while migration is not desirable from a conceptual viewpoint, as adaptive capacity implies living with change by adapting to it, it is increasingly seen as an adaptation strategy itself. Particularly in semi-arid and arid areas, climate-sensitive income strategies such as smallholder agriculture might not be a sustainable livelihood practice in the long term (Solórzano and Cárdenes 2019; International Organization for Migration 2019). From this perspective, *Garantia Safra* potentially promotes unsustainable livelihoods, leading to maladaptation, without offering exit strategies.

6 Conclusion

This Policy Research Brief contributes to the research in the area of social protection and resilience by looking at the *Garantia Safra* public climate risk insurance scheme. When reviewing *Garantia Safra*'s contribution to building resilience, the results indicate that it is a protective instrument providing relief, rather than a preventive instrument fostering resilience in the longer term. In this light, the results serve as a starting point for further discussion about the role of public index-based climate risk insurance in building long-term resilience of poor and vulnerable smallholder farmers.

- First, index-based climate risk insurance schemes need to function well to have the desired preventive function. Only well-functioning schemes with timely and adequate payouts gain farmers trust and, therefore, incentivise positive risk-taking. To this end, data on actual losses are key and require investments in satellite and weather data.
- Second, public insurance solutions alone cannot be expected to build farmers' long-term resilience; nor can they replace more comprehensive social protection systems. Especially in regions with a high incidence of poverty, holistic approaches are needed that not only promote subsidised insurance but interlink complementary programmes with the same poor and vulnerable target groups. This includes lifting extremely poor households to a certain income level through additional measures to increase positive programme effects. Social registries (*Cadastro Único* and *Cadastro Único da Agricultura Familiar*), as information management systems, can

play a greater role in linking social protection programmes to interventions in relevant sectors.

- Third, it needs to be clear what to expect from insurance and under which circumstances other measures might be more suitable. In a context of recurrent climate extremes, humanitarian cash transfers delivered through existing social protection programmes such as *Bolsa Família* can be more effective than a more complex, index-based insurance approach, as they draw on existing registries and payout mechanisms.
- Fourth, there can be two sides to public insurance, and it might even lead to maladaptation when it does not deliver sufficient positive results. When schemes do not display a long-term effect, they might foster negative trade-offs between short- and long-term resilience by promoting unsustainable livelihoods without offering exit strategies. As a result, migration needs to be considered as a strategy to build resilience in the long term.

The evidence from the *Garantia Safra* programme suggests that uncovering social protection's potential to build resilience still requires some work, especially when it comes to long-term

solutions. The findings shed light on the importance of further assessing existing tools to enhance the climate resilience of the poorest and most vulnerable members of society. As the changing nature of climate shocks is already transforming the face of poverty and vulnerability, both old and new types of social protection will inevitably need to prove their potential to combat climate challenges.

1. See Beazley et al. (2016b) for shock-responsive social protection focusing on how social protection systems can be scaled up in response to shocks to minimise the need for humanitarian interventions.

2. According to Bené et al. (2012), resilience can be divided into three capacities: absorptive capacity, associated with shock response; adaptive capacity, referring to incremental adjustment to shocks and stresses; and transformative capacity, linked to profound systemic changes.

3. Among the approaches exploring the links between social protection and climate resilience, three influential frameworks are worth mentioning: (a) adaptive social protection (see Davies et al. 2009); (b) climate-responsive social protection (see Kuriakose et al. 2013); and (c) shock-responsive social protection (see Beazley et al. 2016b).

4. Social protection comprises four central functions: protection, prevention, promotion and transformation (Devereux and Sabates-Wheeler 2004).

5. According to Brazilian law, a family farm is defined as a farm: (a) that covers no more than four fiscal modules; (b) whose workforce consists mainly of family members; (c) whose income derives predominantly from activities on the farm; and (d) that is managed by the family (Medina 2015).

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