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Integration of social protection and climate change adaptation in Brazil

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Abstract

Purpose – Social protection (SP) and climate change adaptation (CCA) are two subjects highly debated when discussing social vulnerabilities and food insecurity in rural areas of developing countries. Both fields address matters related to socioeconomic vulnerabilities and thus present opportunities for integration. However, many studies have stated the lack of interaction within the study areas. When dealing with CCA and SP in Brazil, the two offer an opportunity for integration since some SP programmes (such as food-based safety nets) can both affect adaptation and be impacted by expected changes in climate. Impacts from CC are projected to be extreme in the Brazilian semi-arid Northeast, a region where social programmes of assistance and aid are historically crucial during periods of drought. Thus, the purpose of this paper is to address the interaction of CCA and SP in a conceptual level on policies and programmes in Brazil.

Design/methodology/approach – A desk review of government documents (policies, plans, decrees) related to food security, food-based programmes and CC.

Findings – Based on the results the authors highlight the limited integration between CC and SP in Brazil and the potential for interaction in many of the programmes already in place.

Originality/value – The authors attribute findings to the segmented governmental structure and the weak interaction between sectors, and the only recent discussion of linkages between CC and poverty, development and food insecurity. Discussion on the challenges and benefits of this interaction are provided in a context of CC in Brazil, still not very debated in the academic literature.

Keywords Climate change, Brazil, Food security, Semi-arid areas, Social protection

Paper type Research paper

Introduction

Food security (FS), poverty, vulnerability, adaptation and risk-management are terms commonly used when debating the possible impacts of climate change (CC) on developing countries. CC is predicted to modify many physical, chemical and biological variables related to food production. Changes in the spatiotemporal patterns and intensity of precipitation, in average temperatures, in the frequency of extreme events and in the concentration of greenhouse gases will have an impact on agricultural practices, in the physiology, phenology and diversity of crops, and in ecosystem services much needed to support agricultural activities (Ebi *et al.*, 2010). Modifications in the metabolism of key species, increases in pests and disruption of infrastructure necessary for the transport and storage of agricultural inputs and production are also predicted, with further impacts on the FS of vulnerable populations (FAO, 2008; Paucar-Menacho *et al.*, 2010; Vermeulen *et al.*, 2010). Together with existing socioeconomic vulnerabilities, CC will pose a great toll in the lives of the most resource-limited population, requiring

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immediate action so the impacts do not bring people under higher levels of vulnerability to food insecurity.

To address some of the underlying causes of vulnerabilities related to socioeconomic and environmental shocks and to improve the capacity of people to cope with and adapt to the impacts that ultimately affect levels of poverty and food insecurity, many countries have been designing long-term strategies. These strategies range from more direct programmes focussing on adaptation to certain environmental shocks (e.g. climatic) to indirect initiatives such as social protection (SP) programmes that encompass an ample spectrum of approaches to decrease vulnerability. Even though most SP programmes are not specific in addressing food insecurity, many resulting improvements on household socioeconomic variables and productive practices have the potential to boost the conditions of the most in need.

SP programmes, such as social safety nets and insurance, for example, have been related to various enhancements in the socioeconomic situation and asset accumulation in many rural and urban areas across the world (Adato and Hoddinott, 2008; Davies *et al.*, 2013; IPC-IG, 2013). In addition to addressing the current socioeconomic challenges, those programmes have been praised as an important tool to improve the adaptive capacity of vulnerable populations in face of predicted impacts related to climate variability and change (Bonfiglioli and Watson, 2011; Davies *et al.*, 2009). They can modify socioeconomic variables related to measures of household vulnerability and adaptive capacity, providing a better ability to deal with climatic challenges without the negative effects caused by damaging coping strategies (Davies *et al.*, 2009; Dulal and Shah, 2014).

However, even though researchers and policy makers have observed the possible benefits of addressing the fields of SP and climate change adaptation (CCA) in conjunction, few interactions in policies and programmes have been present so far (Bene *et al.*, 2013; Bonfiglioli and Watson, 2011; Heltberg *et al.*, 2008). On the other hand, a few disagree with the need of integrating initiatives in those areas since SP and CCA programmes focus on vulnerability to different stressors and scales, and thus address different groups of people (Davies *et al.*, 2009; World Bank, 2011). Apart from that, some concur (e.g. World Bank, 2011) that the area of FS is similarly treated in both fields and thus offers room for a positive interaction.

Brazil, like most developing countries, will be impacted by modifications and variability in climate. Expected impacts by CC include intensification of rain events associated with flooding in many regions and extreme drought events in the Northeast (Ambrizzi *et al.*, 2007; Bates *et al.*, 2008; IPCC, 2007; Krol and Bronstert, 2007; Marengo *et al.*, 2011). In the semi-arid areas of this region, past events of intense drought, in conjunction with weak institutional capacity and high-social vulnerability, have resulted in production losses, social unrest, migration, malnutrition and hunger (Castro, 1984; Finan and Nelson, 2001; Kenny, 2002; Livingstone and Assunção, 1989). Government programmes of food aid, water distribution and temporary employment (work-fronts) were extremely significant in those situations. However, in a little more than the last ten years, SP and regional development programmes with a long-term focus were also implemented. For example, in regard to our focus on FS, the conditional cash-transfer *Bolsa Família* and the food-based safety-net programme (PAA) (*Programa de Aquisição de Alimentos*), have been effective in decreasing vulnerabilities related to poverty and food insecurity (Soares *et al.*, 2013; Souza and Chmielewska, 2010).

Based on the presented impacts of CC on FS, the impacts of SP programmes in decreasing the vulnerability to food insecurity and the potential of positive interactions

in addressing climate adaptation in conjunction to social programmes, herein we discuss if both fields are starting to be jointly addressed in Brazil. By investigating documentation related to policies and programmes in the area of SP related to FS and of CC, we discuss if there is an incipient movement at least towards an integrated agenda. The country, as a worldwide example of success in the field of safety nets in the fight against hunger and malnutrition, offers an opportunity to visualize the current status and challenges for this interaction. We explore laws, decrees and national plans related to these subjects with special emphasis to the socially vulnerable semi-arid area.

Research methods

A desk review of national policy and programmes in relation to FS and CCA was conducted with the aims of selecting all documentation related to the main research question. For further discussion related to the apparent conceptual interaction (or lack of) between SP and CCA, a systematic analysis with the search for key terms in the chosen documents was deemed appropriate by the research team. First, all government documents (restricted to laws, decrees and plans) related to both study areas were selected for further analysis. The cut-off date for inclusion of documents was May 2015, so only documents not revoked by this date were included. Documents related to the FBSN initiative PNAE were only included if active after 2009, when the programme was modified to include family farmers as an important component[1].

Initially, 24 documents were selected, including ten related to the FBSN initiative PAA (three laws directly related, and three laws correlated to the programme, four decrees) and four to PNAE (two laws, two decrees), six to national FS (one law, one national plan, four decrees) and four related to CC (one national plan, one law, two decrees) (Table I). Second, all documents were closely analysed for a more in depth analysis. From the first set of documents, 13 were selected for the next step (underlined at Table I). After a first careful examination, some documents were deemed irrelevant for our research due to reference to subjects related only to composition of committees, transfer of funding across departments and other small changes in programme legislation.

The chosen documents had only the content concerning the aforementioned programmes analysed for the selected keywords (third step). For this stage, the

Law		Decree/Plan	
No. 10.696/2003	*PAA*	*No. 7.775/2012*	*PAA*
No. 11.326/2006[a]	*PAA*	No. 7.956/2013	PAA
No. 11.420/2006[a]	PAA	*No. 8.026/2013*	*PAA*
No. 11.524/2007	PAA	*No. 7.352/2010*	*PNAE*
No. 11.718/2008[a]	PAA	No. 7.507/2011	PNAE
No. 11.775/2008[a]	PAA	No. 6.272/2007	FS
No. 12.512/2011	*PAA*	No. 6.273/2007	FS
No. 11.947/2009	*PNAE*	*No. 7.272/2010*	*FS*
No. 12.695/2012	PNAE	No. 8.226/2014	FS
No. 11.346/2006	*FS*	No. 6.263/2007	CC
No. 12.187/2009	*CC*	*No. 7.390/2010*	*CC*
–		*PNMC (National Plan CC)*	*CC*
–		*PNSAN 2011-2015*	*FS*

Table I. Pre-selected documentation for study

Notes: [a]Represents programs correlated in some way to the PAA according to CONAB (2013); italicized documents represent the selected during the second step of analysis

research experts agreed on a set of terms that represent each of the studied areas (Figure 1). Based on analysis of peer-reviewed documentation in the area of FS and CCA, we selected the most common and relevant words that would be in any academic or policy documentation treating those subjects. Thus, the presence of key terms related to FS in the climatic documentation and the presence of climate-related terms in the food documentation are used herein to discuss the interaction among those areas. Furthermore, the number of occurrences of each term as well as the number of total pages in each documentation was provided. However, due to the differences in formatting, an exact number of occurrences/pages would not provide an accurate number to be discussed and the results are treated as presence/absence of terms.

After a careful discussion on the terms to be utilized, the research team agreed that if the FS documents were somehow integrated to the climatic discussion we were expected to find the following keywords: Drought (*Seca/Estiagem*), Climate/Climatic (*Clima/Climático*), Temperature (*Temperatura*), Rain (*Chuva, Precipitação, Excesso hídrico*), Resilience (*Resiliência*) and Adaptation (*Adaptação*) (in the context of CC). In the documents related to climate, we investigated keywords related to FS and social variables: FS (*Segurança Alimentar*), Food (*Alimentação/Alimento*), Hunger (*Fome*), Poverty (*Pobreza*) and Social (Social – in the context of SP). Since the semi-arid region (*Semiárido*) is one of the most vulnerable area in the country when discussing socioeconomic and climatic shocks, and also where the SP programmes on FS have a more relevant impact, we also included a search for this term in both analyses (Figure 1). The chosen keywords were regarded as sufficient to cover the study subject and discuss the interaction of CCA and SP policies and programmes. Figure 2 summarized the research design employed for this discussion.

Results

From the second set of selected documents ($n = 13$) only four presented at least one of the searched keywords for analysis (Table II). Decree No. 7.352/2010, listed by the Brazilian Fund for Education Development as a related document to the ones

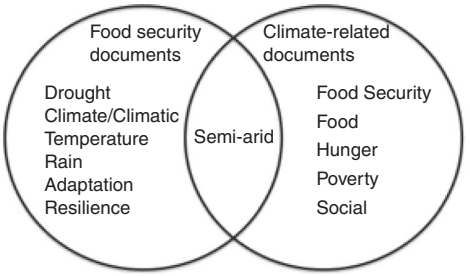

Figure 1.
Selected keywords for the systematic research

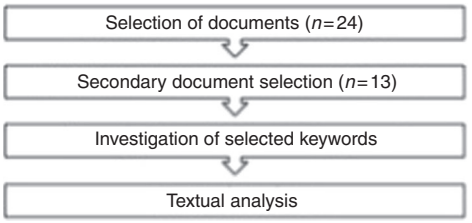

Figure 2.
Research design

Table II.
Presence of keywords in selected documentation

	Law/Decree/Plan	*n* pages	Drought	Semi-arid	Rain	Climate/Climatic	Temperature	Adaptation	Resilience
PAA	No. 10.696/2003	11	–	–	–	–	–	–	–
PAA	No. 11.326/2006	3	–	–	–	–	–	–	–
PAA	No. 12.512/2011	9	–	–	–	–	–	–	–
PNAE	No. 11.947/2009	11	–	–	–	–	–	–	–
FS	No. 11.346/2006	4	–	–	–	–	–	–	–
PAA	No. 7.775/2012	14	–	–	–	–	–	–	–
PAA	No. 8.026/2013	5	–	–	–	–	–	–	–
PNAE	No. 7.352/2010	5	–	–	–	2	–	–	–
FS	No. 7.272/2010	9	–	–	–	–	–	–	–
FS	PLANSAN 2011	132	4 Food	12 Semi-arid	1 Social	7 Poverty	1 Hunger	– Food security	– –
Climate	PNMC	132	4	3	14	2	–	–	
Climate	No. 7.390/2010	6	–	–	–	–	–	–	
Climate	No. 12.187/2009	6	–	–	1	1	–	–	

establishing the functioning of the National School Feeding Programme, deals with the Rural Education Policy, including programme operation, access to food and school functioning. The term "climate/climatic" was found across the text when discussing the need of "adapting school calendar according to productive cycles and regional climatic conditions". None of the other keywords was encountered along the decree. Meanwhile, law 12.187/2009, which institutionalized the National Policy on CC, presented two keywords related to social vulnerability, "social" and "poverty", but not in the sense of SP. According to the document, the policy aims to "conjointly address socio-economic development with protection of the climatic system". The document also states that objectives should be in "consonance with sustainable development, with the aim of reaching economic growth, poverty eradication and social inequality reduction". None of the other keywords were observed.

The analysis of both selected National Plans (National Plan on Climate Change (PNMC) and National Plan on Food and Nutritional Security (PNSAN) 2011-2015) found more of the analysed keywords. The presence of more keywords on these documents is not unexpected once both plans are more comprehensive texts (132 pages each). The PNSAN had presence of terms relative to "drought", "semi-arid", "precipitation," "climate/climatic" and "temperature". Meanwhile, the PNMC had words related to "food", "semi-arid", "social" and "poverty".

In the PNSAN, the terms related to CC were found in two paragraphs mentioning issues associated with effects of CC on food production across the country and specifically in systems dominated by rainfed agriculture, with impacts on food supply and local income generation. In addition, the existence of emergency actions for food supply to people in situations of food insecurity from specific population groups or subjected to climatic shocks was also mentioned (*Distribuição de Alimentos a Grupos Populacionais Especificos*). Furthermore, another emergency action (*Garantia Safra*) referred to is a measure to improve assistance to more families in situations of climate vulnerability, with allocation of at least 35 per cent of funds to women. An important point related to CC is in the priority actions for 2011-2015. The national Ministry of Science and Technology was deemed responsible "for presenting a report with studies and projects related to the impacts of CC on food and nutritional security". However, no reference to this document has been found in the internet page of this department.

The use of "temperature" and "precipitation" was observed only in the initial paragraph when addressing impacts of CC on food production due to temperature changes on rainfed agro-systems. No mention of CCA was made in the PNSAN or any other document related to the studied food-based safety nets. Meanwhile, reference to the semi-arid region was found across different parts of the PNSAN document. Briefly, "semi-arid" is utilized to contextualize the region as one of the driest and thus most socially vulnerable in the country. This vulnerability was attributed to lack of resources to deal with climate impacts, including droughts and diseases, and other impacts. This term is also used in the identification of government initiatives directed to this region, such as programmes of technological innovation, rural sustainable development and water harvesting with the aim of improving productive capacity, FS and coexistence with the semi-arid region. The initiatives are briefly mentioned throughout the document with no further details on how programmes will manage to achieve the proposed objectives.

The PNMC addressed keywords related to FS and SP in a limited extent. The terms FS and hunger were not observed. Poverty was found when discussing the augment in greenhouse gases associated with variables related to decrease of poverty in developing

countries (e.g. more access to energy), and to the National Action Programme to Combat Desertification and Mitigate the Effects of Drought. This programme was developed considering reduction of poverty and inequality in conjunction with other themes related to amplification of productive capacity, sustainable conservation, management of natural resources, improvements in democratic management and stronger institutions.

The word "food" was also used in some occasions. Briefly, improvements in health, food, education and other variables related to adaptive capacity in face of CC were raised as important ones to be tackled through sustainable development actions. In the discussion of mitigation, food was used when referring to some government actions that try to reconcile the need of having crops for bio-energy and for consumption, and the need for more sustainability in the agro-industry. Development of activities encompassing science and technology in the field of land-use, and the understanding of relationships between bio-fuels, food and forestry by the Institute for Applied Economics Research were also mentioned.

The semi-arid region was addressed when referring to fragmentation of CC knowledge, and the need of reliable regional forecasts for the various regions of Brazil due to predicted regional variations in future climate. For the semi-arid areas, development of adaptation strategies related to early drought/desertification warnings and research on biomass production from microalgae were mentioned. The need for considering water resource risk-analysis for semi-arid areas as a management tool was raised as being necessary to increase preparedness, coexistence with the environment and coping with climatic risks.

The use of "social" was observed in a variety of terms, including social inequality, social well-being, social mobilization, social legitimization, social inclusion and social control to name a few. However, the use of "social" when referring to social policies and programmes was limited. The closest reference to social programmes was in reference to the programme Light for Everyone (*Luz para Todos*). This programme has been active since 2003 and has the objective to universalize access to electricity in rural areas and expand the development in poor and isolated areas in the North and Northeast of Brazil. We also investigated the composition of the Brazilian Inter-Ministerial Committee on Climate Change, responsible for the PNMC, composed of 16 ministries, and the Brazilian Forum on CC. An interesting observation was the lack of participation in the committee of the Ministry responsible for SP programmes and most of the actions related to FS, the Ministry of Social Development (MDS). Likewise, the Brazilian Forum on CC does not have the participation of MDS.

Discussion

The need to connect SP and CCA policies and programmes has been raised as an important one in face of current and future socioeconomic and climatic challenges. Tackling hunger and poverty is still one of the most important challenges according to the sustainable development goals (UN, 2016), and the benefits of concurrently addressing CCA, hunger and poverty have been widely discussed in the literature (Davies *et al.*, 2013; HLPE, 2012; Parry *et al.*, 2009; Stern, 2006, Wheeler and von Braun, 2013). First of all, addressing each of these challenges in an integrated way, can lead to optimization of financial and human resources, while at the same time providing the possibility for synergies and more long-term results (Bene *et al.*, 2013; Heltberg *et al.*, 2009). Consequently, current issues such as food insecurity would be more efficiently addressed, but still focus on the need of improving adaptive capacity so current actions could be resilient to environmental changes. For Brazil, where there has been a recent achievement of significantly decreasing

hunger (–82.1 per cent from 2002 to 2014 – UN, 2015), this integration could be a long-term investment in a scenario of CC, once new programmes could still work decreasing food insecurity and hunger but also keep those in the thresholds of leaving those conditions far from being further affected by climatic stressors. Moreover, as the country is facing a political and economic crisis with increasing expenditure cuts in social, environmental and science-related programmes and policies, any strategy focussing on the optimization of resources would be greatly valuable.

Based on our desk review, Brazil has not achieved this interaction, at least in a conceptual level as measured by the presence of keywords in selected official documentation. First, a limited interaction was observed with matters related to SP and FS in the documents addressing CC. Interestingly, no mention of FS or SP programmes (e.g. Family Allowance, PAA) was made in the entire PNMC document, the main document related to Brazil's CC policy until the research date. This finding might be related to the remarkable non inclusion of the ministry responsible for social-related policies MDS as a member in the Brazilian Committee on CC, responsible for the PNMC. Even though the words food and social were employed in various ways, we interpret the lack of importance given to FS and SP, and the lack of participation of MDS in the committee, as a sign of a possible limited communication or lack of awareness about the importance of considering both analysed spheres in conjunction. Additionally, we raise that the very distinct human capacities and backgrounds in each of the ministries (SP at the social development; climate at the environment, and science and technology) give rise to a different perspective on the relative priority of certain issues. Since the regular selection process to enter public jobs in Brazil is composed of public calls requiring certain backgrounds (followed by tests) we also raise the need for those processes to also be adapted to the new interdisciplinary challenges present in our post-modern society.

In the documents related to FS, there are some points worthy of further exploration. The PNSAN explored the theme of CC and some other related keywords in addition to addressing some specific actions for the semi-arid region. However, no mention of CCA is made in the entire document, which in our view represents a disconnection with the importance of guaranteeing pro FS actions that will provide long-term impacts for vulnerable groups in Brazil. An interesting point raised by the decree regulating the functioning of the Rural Education Policy was the adaptation of school calendars to productive cycles and climate conditions. We argue that this possibility could be further developed in other FS legislation and plans of action in Brazil. Adaptation of programmes to the variability in climate and productive cycles constitutes important progress when dealing with food-based safety nets (e.g. PAA/PNAE) from both the side of direct (children at school, for example) and secondary beneficiaries (family farmers). This need is important to be considered by policy makers in Brazil and other developing countries since FBSN programmes, especially the ones based on home-grown production (home-grown school-feeding (HGSF)), have been shown to provide a multitude of direct and indirect effects on rural areas around the world but are at times reliant on traditional production systems with no technological alternatives to cope with impacts on the production. Benefits related to FBSN initiatives include increased income for producers, more production and diversity of planted crops, inclusion in local-markets and other multiplier and spillover effects (e.g. Sumberg and Sabates-Wheeler, 2011).

In addition to the natural climatic variability that at times can impact the production to programmes, CC, with an overall predicted presence of more extreme events, can

place extra pressure on the already delicate system that involves poor producers that rely on being suppliers to those programmes for income and vulnerable recipients of food that most of times includes poor children, elderlies and other groups that live in the margin of society. Regarding those possible impacts, some studies have already demonstrated how small-scale food procurement schemes can be disturbed due to climatic shocks and those lessons should not be taken for granted during policy planning and implementation. In Ethiopia, a drought disrupted a HGSF programme as local farmers decided to make use of supplies in their own household instead of providing to the community programme (Remans *et al.*, 2010). In these situations, more vulnerable houses, without the necessary stocks or assets for producing food or coping with momentary shocks and relying in social programmes to alleviate some of the pressure for the household, can suffer a significant impact. In Brazil, there are also some reports of difficulties due to climatic shocks (droughts) in earlier versions of procurement schemes in the Northeast of Brazil (PROCAB, from 1977) (Silva, 1995), and new investigation on how climate variability and change affects programmes in place are extremely relevant. A further step to be taken through plans and policies in the field of FS is the recognition that climate shocks not only affect FS but also result in other long-term effects, such as impacts on community health, child labour and education and loss of land and assets. Households that are both asset-limited and climate-sensitive (e.g. that own livestock) will be especially more vulnerable since those have a limited capacity to manage risks and are more affected by climatic shock (Heltberg *et al.*, 2009).

In addition to the integration of climate variability, change and adaptation in food-related initiatives, some authors also explore the need for integration in some other SP programmes, such as conditional and unconditional cash-transfer programmes, and insurance schemes. The coupling of vulnerability and risk data to those initiatives has been suggested as a way to scale up interventions during periods of shocks (Devereux *et al.*, 2012; UNDP, 2011). In Brazil, the possibility of integrating climate with conditional cash-transfer programmes appears particularly feasible when considering the coverage and the effects that the programme *Bolsa Família* has been demonstrating since the start of implementation. Since 2003, the programme, which guarantees a minimum allowance to low-income families that fulfil certain conditions related to health and education, has been decreasing socioeconomic vulnerabilities across the country (Campello and Neri, 2014; Soares *et al.*, 2013). As one of the world's most extensive cash-transfer programmes with a vast database of beneficiaries, this programme has the potential to be adjusted to consider that most of the beneficiaries are the ones also vulnerable to climatic impacts, making it even harder for those people to graduate from participation due to shocks (i.e. climate impact can make people dependent on SP initiatives for longer periods).

Asfaw *et al.* (2011) highlight that social safety nets should consider climatic impacts when analysing the existing risks and vulnerabilities of households. Thus, for the Brazilian case and for any other country that has a major part of population dependent on SP programmes that affect FS and that will have production systems affected by changes in climate, we underscore the need for observing the distribution and overlays of populations that are socioeconomically vulnerable (and participate in the programme), and those that are geographically vulnerable and are thus on the verge of becoming potential beneficiaries if disturbed by shocks. Preventative measures, with the consideration of climatic impacts in mind, could give opportunity for more actions related to improvements on infrastructure, livelihood and asset accumulation that

strengthen the resilience of those on the threshold. However, for that objective, it is still important to understand the interactions between socioeconomic and geographic vulnerability, participation in SP programmes and the benefits of climatic adaptation.

In Brazil, this aim could be reached through more interaction at the policy level and development of large-scale programmes involving this broadly implemented CCT programme and other programmes related to risk-management and preparedness that somehow have an influence over the adaptive capacity of populations (cistern programme, crop insurance, etc.). Even though those safety-net programmes do not constitute the sole solution to boost climate adaptation, some can have a catalyst effect over the population, influencing levels of education, participation in local institutions and generating long-term transformative changes (Wood, 2011). If well planned and implemented, SP can safeguard vulnerable populations from adopting damaging coping strategies. Those include the depletion of all sorts of asset bases (e.g. livestock, money, machineries and land), increase in vulnerability and consequently the limited ability to escape poverty over the long term (Heltberg *et al.*, 2009).

More specifically for the semi-arid, the most socially vulnerable area to CC in Brazil and where SP and climate adaptation programmes are much relevant, the need for regional forecast and actions for decreasing poverty and improving the coexistence with the environment were mentioned in the documentation. One noteworthy point explored in the PNSAN was the suggestion of early warning systems, development of reliable forecast, and the need for regional knowledge of climate impacts, which could all be integrated within SP initiatives. The need for climate forecast information systems to better inform risks associated with climate variability, and improve the efficiency of emergency and response actions for FS has already been highlighted by high-level documents on FS, such as the Rome declaration on world FS (FAO, 1996). Thus, the implementation of modified versions of current social programmes with the inclusion of a climatic component in the semi-arid area or any other region with some sort of regular climatic impact (regionalization of programmes) could be used as pilot programmes for further scaling up.

Regarding the social programmes in place at the semi-arid region and with the potential for further investigation on the benefits of integrating the climatic variable, there are two groups that apparently oscillate in importance during the year. During regular times, the vulnerable inhabitants rely on social assistance programmes, such as CCT (*Bolsa Família*) and FBSN programmes (PAA and PNAE), while during drought periods participate in emergency initiatives, such as water re-supply programme (Water-tank Truck Programme), subsidized corn programme (*Compra de Milho Balcão – CONAB*) and an emergency cash-transfer programme (*Bolsa Estiagem*) complementing the first ones. Some farmers also participate in insurance initiatives such as the crop insurance programme (*Seguro Safra*). Thus, any action towards transforming programmes in more optimized versions, with more coverage, economy and resilience to climatic impacts will be welcomed to keep vulnerable people out of situations of food insecurity and hunger.

Finally, a better understanding on the social costs of prioritizing actions of assistance over emergency ones in a scenario of climatic shocks, as well as the effects of those choices over the efficacy of programmes in taking people out of poverty, hunger and food insecurity could assist the transition towards the choice of more integrated long-term strategies. For example, the installation of cisterns in drought-prone areas of Brazil can illustrate an initiative that started as an emergency measure that over the years has been transformed into an assistance programme. The one million cisterns programme (P1MC, from 2003) provides cisterns for water harvesting for household

consumption during regular periods, and for use with emergency water re-supply programmes (Water-tank Truck Programme) during drought periods. Thus, the P1MC, despite being considered an emergency measure by the Brazilian government, provides benefits not only during the shock period but also during the other times of year since people can guarantee a more stable supply of water for household activities. Even though many rural regions have access to public water distribution systems, many times those are unreliable even during regular periods. In our view, this programme is the only one active in Brazil that represents a clear convergence between the studied subjects since it provides a link between actions that take the climate consideration into account (drought impacts), with the use of asset-transfers (cistern) that improves food health and safety due to better water consumption, and that has potential to improve many households determinants of adaptive capacity.

Conclusion and recommendations

The discussed lack of conceptual interaction between policies and programmes in the area of SP and CC appears to exist in Brazil, at least when related to the selected documents of FS, food-based safety nets and CC. This pattern can be an expression of the ways that policies are segmented in the Brazilian government and lack of proper interaction between sectors, in conjunction with the general infancy of the understanding of CC and the linkages with poverty, development and food insecurity. As noted, especially in face of current environmental issues, interaction of climatic and other environmental knowledge in policy-making processes is essential to achieve resilient SP programmes, but also to avoid undermining benefits accrued from other climate adaptation strategies.

Based on this, we have discussed some of the mentioned interactions highlighted in the documents and explored how the variable climate can be incorporated within some of the Brazilian programmes on SP or in any other country with similar strategies and challenges. The need for regionalization of programmes in semi-arid areas (as pilot initiatives) was raised as an important change to be implemented as a means to incorporate climate variability into programmes. This region is the most socially vulnerable to CC, with lower levels of socioeconomic indicators and with a high number of beneficiaries from social assistance and emergency programmes, and therefore would be a good case study for this interaction. This would also assist in avoiding that people who are closer to get graduated from those programmes fall once again to lower levels of vulnerability due to climatic impacts. Later, this incorporation could be extended to other environmentally and socially distinct vulnerable areas (e.g. Amazon) and even incorporated in national-level strategies.

The development of early warning systems based on climatic data, together with data on geographic vulnerability and the interaction with database of social assistance could assist on scaling up of payments during shocks and coverage of populations that are on the threshold of becoming beneficiaries. We finally underscore herein the need for more research on this area once SP programmes can be utilized as triggers of adaptive capacity. The focus on education, health, gender equality, improvement of productive capacity, technical assistance, participation in associations, among others, can clearly contribute to a decrease in vulnerability to CC and to food insecurity in a diversity of scales and scenarios. The need for better understanding and integrating the environmental impacts on programme functioning is a clear finding of our research. Policy makers in developing countries with similar environmental aspects and social challenges as

those presented herein, should focus on migrating programmes of emergency to assistance, on decreasing social and geographical vulnerability and on improving resilience of people and programmes to CC.

Note

1. During the preparation of this manuscript a new National Food Security Plan and a National Climate Adaptation Plan were being prepared.

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