



Governance and Community Responses to Floods in Poor Peri-urban Areas

The case of Urban Disaster Risk Reduction and Climate Change Adaptation in Pikine, Senegal

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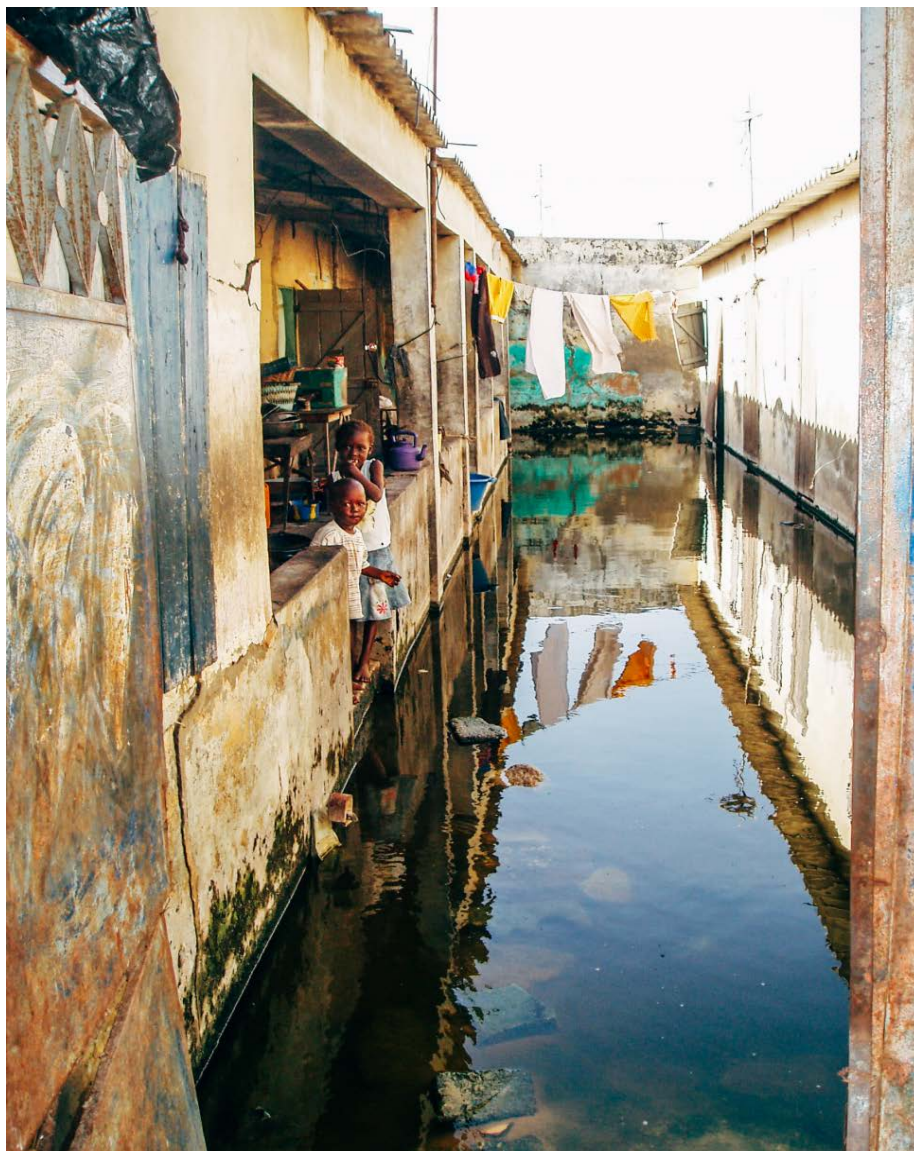
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Governance & Community Responses to Floods in Poor Peri-urban Areas

The case of Urban Disaster Risk Reduction
& Climate Change Adaptation in Pikine, Senegal



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Abstract

In recent years, urban flooding has become an increasingly severe and frequent problem for the poor in many West African urban centres. In diverse metropolises of the region, including Lagos, Cotonou, Accra, Abidjan and Dakar, low-income populations who typically live undesirable flood-prone areas see their already considerable vulnerability increased for every flooding event. In the long term, climate change is expected to make matters worse for these already tried populations, due to an increase in storm frequency and intensity, and with them in the risk of floods. However, climate change-induced changing weather patterns and more extreme weather events are only part of the explanation for this situation, as large segments of the urban population in West Africa are not offered the public services, infrastructure and protective regulations needed in order to respond to floods. In Senegal, in spite of significant development aid and interventions, the number of flood victims in urban centres has increased steadily since 1999.

Against this background, this dissertation examines how the governance for floods is configured at the national and municipal scales, in a context of weak state capacity. The dissertation addresses how urban flood management, community responses and resulting public services are produced, as well as the implications thereof. It is investigated how floods have been managed in urban Senegal during the last fifteen years and examines why it has not led to the results expected by the population, state institutions and the donor community. It is found that the significant support allocated to flood management has created a political and personal appropriation of flood management processes at the national level. This has resulted in a fragmented institutional framework with overlapping institutions, duplicate mechanisms and an ongoing 'negotiation' of competencies and interpretation of mandates, which have limited the impact of flood management in Senegal. In spite of the lack of achievement in the domain of flood management, it is found that weak state capacity does not mean that the urban poor are simply passive victims of climate change, or that collective services and interventions relative to flood management are inexistent or ungoverned. Instead, the ability to respond to floods is to a large extent formed outside the realm of the state and is maintained through a set of complex negotiation processes among various actors involved in diverse governance modes, found inside and outside the formal state bureaucracy and the official policies and plans in Senegal. The findings also reveal that community responses may not, by themselves, sufficiently compensate for the lack of basic services and infrastructure that is forcing the urban poor to cope with disproportionate levels of risk.

Table of Contents

Acknowledgements

Abstract

Part 1: Synopsis

1. Introduction	1
1.1 Background	1
1.2 An urban focus	3
1.3 Coping and adaptation capacity	4
1.4 A focus on governance and institutions for CCA and DRR	5
1.4.1 <i>Why a focus on governance and institutions?</i>	5
1.4.2 <i>State reforms: decentralisation and good governance</i>	6
1.5 Focus of research	9
2. Analytical framework	15
2.1 A state failure perspective	15
2.2 An anthropology of public spaces and public action	16
2.2.1 <i>A 'real governance' perspective</i>	16
2.2.2 <i>An actor-oriented perspective</i>	18
3. Research design and Methodology	20
3.1 A grounded theory approach	20
3.2 Ethnographic approach to conducting fieldwork	21
3.3 Limitations and biases	22
3.4 Coding	23
3.5 A Case Study approach	24
3.5.1 <i>Case study area</i>	25
3.5.2 <i>Underlying causes for recurring flooding in Pikine</i>	28
3.6 Data collection: Process and techniques	30
3.6.1 <i>Qualitative interviews</i>	31
3.6.2 <i>Focus-group sessions</i>	33
4. Conclusions	34

Part 2: Articles

ARTICLE 1	49
ARTICLE 2	75
ARTICLE 3	95
APPENDIX: Inventory of formal interviews	

1. Introduction

This dissertation addresses how the processes of climate change adaptation (CCA) and disaster risk reduction (DRR) in urban areas are translated nationally and locally in a context of the weak state capacity of a developing country such as Senegal. More specifically, this dissertation addresses, empirically and conceptually, how urban flood management, community responses and the resulting public services are produced through a set of complex negotiating processes among various actors both within and outside the formal state bureaucracy and official policies and plans in Senegal, as well as their implications. The main argument which is pursued throughout the thesis is that weak state capacity does not mean that the urban poor are simply the passive victims of climate change, or that collective services and interventions relative to flood management do not exist or remain ungoverned. Instead, the ability to respond to floods is to a large extent formed outside the realm of the state and is maintained through specific processes and mechanisms at various scales. An understanding of how these unfold and are maintained in an urban perspective in Senegal is thus at the very heart of this study. Before the research questions and objectives are developed in further detail (see Section 1.5), the following section introduces the rationale and relevance of the topics examined in this dissertation, starting with the background to studying climate change adaptation and disaster risk reduction.

1.1 Background

Human-induced climate change¹ is widely perceived as one of the 21st century's main challenges facing the international community. Given the evidence presented in the United Nations' Intergovernmental Panel on Climate Change's fourth assessment report in 2007, the consensus is that human-induced climate change is highly likely, and that some is inevitable. Sub-Saharan Africa was identified as being among the most vulnerable region due to its low adaptive capacity and projected changes in rainfall (IPCC 2007). It is now widely recognized that droughts, floods, rises in sea level, changing mean temperatures and increased variability of weather patterns are expected increasingly and disproportionately to affect one of the regions with the least capacity to tackle these harsh manifestations of a changing climate (IPCC 2014). Initially natural sciences dominated the research agenda on climate change in the search to establish the likelihood and magnitude of climate change. Although uncertainty still remains as to the timing and magnitude of projected climate change, particularly at the national and sub-national scales, discussions of climate change have shifted in focus to encompass societal responses as well, categorized as mitigation (reducing emissions) and adaptation

¹ Climate Change is defined as: "*a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use*" (IPCC 2012).

(to unavoidable change). Climate change adaptation (CCA) has the ability to reduce the risks and adverse impacts of climate change and is considered unavoidable and complementary to climate change mitigation efforts, as even the most effective reductions in emissions, cannot prevent further climate change impacts (Klein 1998). Climate change adaptation is defined here as : 'the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities' (IPCC 2012).

As a distinctive agenda, climate change adaptation has thus developed from human ecology, geography, economics, and the anthropological and political sciences, and has also been embraced by the development assistance and disasters communities. The available research on climate change uniformly confirms that developing countries face the largest impacts and risks related to climate change and at the same time have the greatest vulnerability² and lowest capacity to cope with and adapt to such impacts and risks (Swart et al. 2003). These impacts have economic, social, demographic, technological and political implications (Pittock and Jones 2000) and are already plunging vulnerable populations into a vicious circle of increased poverty and vulnerability. By multiplying present vulnerabilities, climate change impacts therefore represent a threat to sustainable development (Hewit 1995). Consequently, there is a broad consensus that sustainable development and climate change adaptation are closely intertwined (Burton 2000) and that alleviating the root causes of vulnerability and increasing the adaptive capacity³ of individuals and societies in general thus has positive implications for climate change adaptation.

The climate adaptation agenda is also closely linked to the agenda concerning disaster risk reduction, as the majority of disasters are attributed to climate-related hazards⁴, which are expected to increase in magnitude and frequency in the future (Birkmann and Teichman 2010). These agendas are also tightly intertwined because societal responses to current climate variability and extreme events are used as proxies for comprehending future climate change vulnerability and adaptation needs (Burton et al. 2002). This is because impacts due to climate change and those resulting from climate variability are considered to be imperceptible (Hulme et al. 1999). A disaster being 'the product of the interaction of the hazard (event) and the vulnerability conditions of the society of elements exposed' (Jörn Birkmann & Teichman 2010), disaster risk may thus be limited by sustainable development (Field et al. 2012). Since climate change is causing increased disaster risks, actions to reduce these risks thus need to reduce vulnerability in the context of development efforts (Schipper and Pelling 2006). Accordingly, reducing the impacts of disasters may therefore be accomplished both through disaster risk reduction

² Vulnerability is defined as: "The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards". (UNISDR 2009)

³ Adaptive capacity is defined as 'the vulnerability of a society before disaster strikes and its resilience after the fact'.(Dayton-Johnson 2004).

⁴ Hazard is defined as: "A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological and biological) or induced by human processes (environmental degradation and technological hazards)". (UNISDR 2009)

and climate change adaptation (McBean and Rodgers 2010). With the expected effects of climate change on natural hazards, the relevance of and need for a systematic integration of CCA and DRR interventions is being discussed amongst international development actors, as well as amongst the respective research communities, where the dynamics between climate risks and development are in focus (O'Brien et al. 2006; McBean and Rodgers 2010; Birkmann and Teichman 2010; Allen 2006; Schipper and Pelling 2006). The interconnectedness between the two agendas is also in evidence in the special report of the Intergovernmental Panel on Climate Change (IPCC) on 'Managing the risks of extreme events and disasters to advance climate change adaptation (IPCC 2012).

1.2 An urban focus

Interventions from governments and international development actors within CCA and DRR in developing countries are predominantly concentrated on rural areas, and urban funding strategies have been slow to develop (Pelling and Wisner 2008). The limited focus on urban CCA and DRR stands in sharp contrast to the present situation and the expected development in urban areas in developing countries. More than one billion urban inhabitants across the world live in overcrowded settings, in poor-quality shelters, without access to basic services, and often without security of tenure. This number is expected to double to two billion by 2050 (UNHABITAT 2008). In Africa, 72 per cent of the urban population is estimated to be living 'under slum conditions' (UNEP 2007b). At the same time the number of people living in informal settlements in the world is rapidly increasing, as it is estimated that the urban population living in Africa will more than double from 294 million in 2000 to 742 million by 2030 (UNEP 2007a).

Environmental hazards are having severe negative effects on urban environments in many African cities, with floods affecting nearly a third of the totality of the disaster-affected population on the continent (Guha-Sapir et al. 2014). Floods are at present seriously impacting the livelihoods of the urban poor on the continent (Satterthwaite et al. 2007), and it is projected that by 2020, between 75 and 250 million people will be exposed to increased water stress due to climate change (Barros et al. 2014). In Senegal, where in 2005 it was estimated that 38.1 per cent of the urban population were living in slums (UNHABITAT 2008), flooding has been reported recurrently over the last thirteen years (Guha-Sapir et al. 2014). The causes of flooding in these zones are complex and multiple and range from rapid and unplanned urban growth to a climate change-induced increase in the volume and intensity of rainfall (see Section 3.5.2). Due to climate change, a higher frequency of heavy rainfall events in the area is likely to increase the incidence of floods in the long term (World Bank and GFDRR 2011).

In addition to these bleak statistics, an urban focus calls for the development of new intervention approaches to climate risks and adaptation, because rural approaches and methods may not be directly transposable to urban settings. Urban dwellers struggle with different sources of vulnerability than rural

populations. Commoditization, additional causes of environmental risk (poor housing and infrastructure and pollution) and social fragmentation are elements that often make poor urban-dwellers the most vulnerable to climate change impacts and that reveal the relevance of a specific urban approach (Moser et al. 1994). Poor urban dwellers prone to floods generally live on the outskirts of urban areas, zones which are commonly labelled 'peri-urban' (see Section 3.5.1) and are characterized by informal settlements, poor basic infrastructure and public services, and informal economies (Maheu 2012). These are zones of rapid change that are experiencing a number of detrimental outcomes to these changes, such as environmental degradation (Mbiba and Huchzermeyer 2002).

Until recently the scientific literature on CCA and DRR largely focused on rural areas, and although the specificities of urban contexts for issues pertaining to DRR and CCA are gaining increased attention (See Simon 2010; Satterthwaite et al. 2007; Lwasa 2010; Moser and Satterthwaite 2010; Pelling 2011; Douglas et al. 2008; Wamsler 2006) research on the experiences and realities faced by the urban poor in disaster-prone areas threatened by climate change is still limited (Moser and Satterthwaite 2010). In West Africa, research on environmental infrastructure and urban service delivery (water, sanitation, drainage and garbage collection) has examined some of the explanatory structural and historical factors for scarcities in service provision in urban and peri-urban centres (Gandy 2006; Nunan and Satterthwaite 2001; Resnick 2014b; Resnick 2014a. Moreover, the impacts and causes of urban flooding (Mbow et al. 2008; Douglas et al. 2008b), the vulnerability of urban communities in flood-prone areas (Adelekan 2011) and the disaster risk reduction measures that have been adopted in specific cities (Diagne and Ndiaye 2009; Gaye and Diallo 1997; Diagne 2007) have also been objects of research in West Africa. However, limited research has examined the governance mechanisms and institutions involved in urban DRR and CCA in the region (see Bang 2014; Thiam 2013).

1.3 Coping and adaptation capacity

The need to widen the adaptation focus beyond technical and infrastructure options, such as better drainage systems or coastal defences, is broadly acknowledged. At the core of this agenda is the recognized need for a better understanding of the nature of vulnerability and the resilience of human systems to climate change in terms of who and what are vulnerable, to what stresses, in what way, and what is the capacity of vulnerable populations, in order to determine appropriate responses (Ford et al. 2010). Reducing vulnerability is thus paramount in obtaining suitable CCA and DRR (IPCC 2012). As indicated in the Hyogo Framework for Action, 'the principal challenge lies in the understanding and better framing of the multidimensional nature of vulnerability' (UNISDR 2007). The concept of vulnerability, originating in risk, hazards and disaster studies, has thus gained increasing popularity in global environmental change studies (Blaikie et al. 1994). Since the impact a disaster has on affected populations is not determined by floodwater alone, but also by how vulnerable they are, the capacity to measure vulnerability is essential for effective risk reduction and climate adaptation (Birkmann 2006).

A different perspective, which may be considered as the opposite of examining vulnerability (Adger et al. 2005) namely addressing the means to strengthen local resilience, is gaining ground within the global environmental change research community, as well as in the development community of practice (Adger 1999; Adger 2003; Few 2003). Resilience in the context of climate change and urban areas is defined here as the capacity of a city and its citizens to absorb climate change-related disturbances and shocks while retaining the same basic structure and way of functioning (Satterthwaite 2013). Dayton-Johnson's (2004) definition of adaptive capacity as the 'vulnerability of a society before disaster strikes and its resilience after the fact', condenses well the link between vulnerability and resilience. By focusing on local resilience and adaptation capacity, rather than vulnerability, the focus is shifted to consider the urban poor as active agents, rather than as simply passive victims of circumstances, which is characteristic of the prevailing focus on local vulnerabilities to climate stresses (Eriksen et al. 2005).

Attention is thus turning towards an improved understanding of variations in local coping⁵ and adaptation strategies and capacity, as an alternative to the focus on local vulnerabilities to climate stresses. A growing body of literature within the broader field of CCA focuses on adaptation processes at the community level and the role of community-based adaptation and participatory processes in increasing local resilience to climate risks (Carrapatoso and Kürzinger 2014; Reid and Huq 2007; Forsyth 2013; Allen 2006; Few et al. 2007; Bryan and Behrman 2013; Moser et al. 2010; Tanner and Mitchell 2008). Within this literature, some scholars have considered the extent to which increased adaptation capacity may develop from existing coping strategies (see Berman et al. 2012; Wamsler and Brink 2014; Wamsler 2007; Cooper et al. 2008; Jabeen et al. 2010; Eriksen et al. 2005). It is, however, still not clear whether communities are developing their capacity to adapt to future climate change through their current strategies to cope with current climate variability – which should therefore be considered a step towards adaptation – or on the contrary, whether the current strategies may lead to maladaptation,⁶ thus jeopardizing sustainable development in the long term (Berman et al. 2012).

1.4 A focus on governance and institutions for CCA and DRR

1.4.1 Why governance and institutions?

The ability to adapt to climate change and cope with disasters is determined by how vulnerable people are treated within societal structures and their ability to act collectively (Adger et al. 2003). This ability is supported by the perceptions and decision-making structures found in society (Wolf 2011). Since actions taken at the individual level are ultimately confined by the social hierarchies and institutions of society, the nature of local institutions and governance mechanisms is fundamental to communities'

⁵ Coping is defined here as 'the ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters' (UNISDR 2009).

⁶ Maladaptation is defined here as 'business-as-usual development which, by overlooking climate change impacts, inadvertently increases exposure and/or vulnerability to climate change. Maladaptation also includes actions undertaken to adapt to climate change impacts that do not success in reducing vulnerability but increase it instead' (OECD, 2009).

capacity to adapt to climate change (Mearns and Norton 2010; Agrawal, 2010a). In this sense adaptation processes are influenced by the interdependence of agents through their relationships with each other, with the institutions they are part of and with the source base on which they depend (Adger 2003). Hence, CCA and DRR also occur through the actions of individuals which are facilitated or hampered by various actors and institutions, as well as through the actions of the institutions themselves (Kelly and Adger 2000). The nature of these relationships is thus central to the configuration of adaptation and coping capacity. As expressed by Agrawal et al. (2009): 'Institutional arrangements structure risks and sensitivity to climate hazards, facilitate or impede individual and collective responses, and shape the outcome of such responses'. Failing to take these into account may thus have implications in terms of equity, legitimacy and the social acceptability of programmes and policies. At the same time, the legitimacy that local institutions possess in society is often overgeneralized, which may underestimate the various power relations embedded in them.

Against this background, the role and configuration of local governance and institutions for poor populations' vulnerability and resilience to climate events is receiving increasing attention in both the scholarly literature (Agrawal et al. 2008; Agrawal 2010; Adger 2000; Adger 2003; Dodman and Satterthwaite 2008; Fatti & Patel, 2013; Few 2003; Satterthwaite 2013) and in reports on climate change (e.g. Working Group II's contribution to the Fifth Assessment Report of the IPCC (IPCC 2014)). The nature of local governance and institutions is also determining for the extent and quality of the services provided in order to cope with and adapt to climate change. Understanding how they function in relation to climate change impacts is therefore key in examining local coping and adaptation capacity.

1.4.2 State reforms: decentralisation and good governance

Given the support to decentralization that has characterized donor-driven public-sector reforms on the African continent, key areas of public services (urban management, health, sanitation, economic development, etc.) have typically been transferred from central government to local municipalities in West African urban contexts. Consequently, municipalities are expected to play an active role in DRR and CCA planning and in the provision of related services. However, the devolution of responsibilities is rarely followed by adequate resources, which has resulted in weak service delivery mechanisms and local municipalities that are characterised by a lack of financial and human capacity and weak coordination (Eyoh and Stren 2007). Instead of increasing local accountability, it is found that the process of democratic decentralisation has often resulted in a lack of decision-making for climate adaptation, as seen in the example of vulnerability to coastal storms (Adger 2003). The lack of technical and financial capacity on the part of both national and local government institutions to find an answer to climate change-related floods is a critical issue in West African contexts (Baudouin 2014). As a result, there is a considerable need to compensate for the void left by low state capacity in infrastructure and

basic service provision in urban areas, which has direct implications for the way DRR and CCA are configured locally.

The extensive informalisation of African cities may on the surface appear to be a manifestation of the weakened and powerless African state, which is a position shared by scholars who view the state as an entity characterised as 'failed' or as a 'shadow' (Reno 2000) (see Section 2.1), which is in deficiency of popular legitimacy and administrative capacity (Hagmann and Péclard 2010). Expert reports (from IMF, bilateral cooperation agencies, World Bank etc.) recommend official modes of Western accountability to governments that are correspondingly regarded as dysfunctional, through for example decentralisation, the reinforcement of control, verification through audited accounts etc. With decentralisation, 'good governance' came to be advocated by donors as the means to ensure more representative and accountable government structures in the provision of urban services (Stren 2014; Nunan and Satterthwaite 2001). This perspective takes as its point of departure the deviations from what ought to be in place in the state bureaucracy, based on Western criteria and the norms of new public management. Consequently, 'bad governance', defined as both unrepresentative government and inefficient non-market economic systems (Farrington, 2015), has been used to describe the gap between the formal idea of the functioning of local political institutions and the way they operate in practice (Blundo and Le Meur 2009).

The point of departure in this dissertation is that the outlook manifested in the prevailing application of 'good governance' and new public management as a one-size-fits-all solution for state reforms based on Western norms and values fails to address how governance in Africa is really configured. These deviations from the official norms of Western bureaucratic models are typically using notions such as clientelism and neopatrimonialism to describe the functioning of the public administration, while the way the public administration actually functions, seen from an empirical perspective, is ignored. In accordance with critics of the 'good governance' approach (Bierschenk and Olivier de Sardan 2014; Blundo 2002), it is found that seeking to assess reality from a normative ideal, by addressing the gap between what is observed and what should be observed is not neutral. It applies a moral judgment of what good is or should be. Consequently, a main critique of the 'good governance' approach is that it is unrepresentative of how state institutions actually function and are translated, and of the ways in which public services are provided in contexts of poor financial means. Therefore, a number of scholars have proposed a non-normative and empirical approach to the study of governance (Hahonou 2015; Anders, 2002; Booth 2011; Crook and Booth, 2011; Olivier de Sardan 2011a; Blundo and Le Meur 2009; Bierschenk and de Sardan 2014). According to this body of research the lack of capacity and resources on the part of the state in Africa does not mean that a void exists in its place (Bierschenk et al. 2000; Olivier de Sardan 2011; Lund 2007). Instead a multitude of actors complement and substitute the role of the state, through collaboration and conflict. In this sense, a wide variety of institutions exercise

governance, meaning that public services are governed by various combinations of statal, associative, individual, entrepreneurial and exogenous aid-driven forms (Olivier de Sardan, 2011c).

In urban contexts, scholars such as Allen (2004), Lindell (2008), Beall (2001) suggest that the local state continues to exercise influence and involves various actors and groups, such as community groups and social networks, which are used by local governments for the delivery of public services. The different alliances and relationships with non-state actors thus have a central function in the creation of public authority. Consequently, since the state does not have a monopoly in producing public authority or delivering services, governance is more than a sole question of official bureaucratic authority (Pelling and Wisner 2008). In this study, governance therefore relates to 'situations in which ordering is neither restricted to the state, nor located in other (traditional or local/indigenous) institutions' (Blundo and Le Meur 2009). At the national level, a clear manifestation of the converging and contradictory elements, just described, which constitute the state is the growing role played by donors in national policies, where development institutions and states increasingly overlap, in particular since the Paris Declaration in 2005.

There is a growing body of literature addressing the role of local institutions and governance arrangements for vulnerable populations' adaptation and coping capacity (Agrawal et al. 2008; Agrawal 2010; Berman et al. 2012; ; Yaro et al. 2014), including some literature focusing on these aspects in urban contexts in particular (Wamsler and Lawson 2012; Kern & Alber, 2009; Satterthwaite 2011; Fatti and Patel 2013; Dodman and Satterthwaite 2008; Bicknell et al. 2009; Tyler and Moench 2012; Satterthwaite 2013). Some of the shared topics which are distinct in discussions on the institutions and governance of local adaptation concern the importance of the ends of institutional change rather than the means, where the focus is often how local institutions may be used as vehicles for risk management and adaptation, as Dovers and Hezri (2010) have also found. Some common themes in focus here include, among others: the importance of public policy-making and implementation, institutional barriers to adaptation, the suitability and capacity of current institutions, the need for public and community participation, and the significance of local contexts. Often these arguments remain rather generic, with little attention being paid to the mechanisms and processes involved. Moreover, a sharp distinction is often drawn between formal and informal institutions, which are seen as a dichotomy rather than a continuum. These emphases are considered insufficient to grasp contextual particularities and to understand the way institutions are translated in practice. Although there is a body of literature addressing the multiple sites of governance in the provision of urban services (Lindell 2008; Nunan and Satterthwaite 2001; Resnick 2014b; Cammack 2011), research on the nature of 'real governance' and institutions for DRR and CCA from an empirical perspective remain scarce.

1.5 Focus of research

Having outlined the background for and relevance of addressing coping and adaptation strategies at the local level, as well as the configuration of CAA and DRR governance from an urban and developing country perspective, this section presents the overall objective of the dissertation, the research questions and a summary of how they are addressed in the respective articles.

The aim of the thesis is to explore how the state is exercised, translated and influenced by diverse actors at the national and municipal scales with respect to urban flood management in the context of Senegal, where there is a considerable need to compensate for a void left by low state capacity in infrastructure and basic service provision. The main research question which has guided the articles constituting the thesis is thus as follows:

Main RQ: How is the governance of urban flood management configured in Senegal at the national and local levels, and what are the consequences of such configuration?

In order to answer this main research question, three subsidiary research questions have been formulated, each corresponding to one article constituting the thesis:

RQ 1: How have urban floods been managed in Senegal and why has this management not led to the results expected by the population? (Article 1)

RQ 2: How are urban flood management services configured locally in the absence of adequate public services, infrastructure and protective regulations and what are the consequences of such configuration? (Article 2)

RQ 3: How do poor urban dwellers cope with and adapt to perennial floods in a context of weak state capacity?
And are local coping strategies a stepping stone towards adaptation, or are they on the contrary likely to lead to maladaptation? (Article 3)

A brief summary of how these research questions are addressed in the three articles is outlined in the following.

Article 1 investigates the background to the limited achievements in tackling recurrent flooding in Dakar's peri-urban areas. It is found that the presence of many donors and international aid agencies and the abundance of funds allocated to the urban flood response in Senegal have contributed to complex national flood management processes, attracting a wide array of competing actors and institutions at the national level. Based on an 'actor-oriented' perspective and 'entangled social logics', approach interventions are analysed as part of ongoing socially constructed and negotiated processes

(Long and Ploeg 1989), where the actors involved in flood management have various forms of influence, conflicting interests and divergent motives (Bierschenk 1988). The emphasis is on the underlying constructed and negotiated processes, the ongoing contestations and the political struggles which configure their particular room for manoeuvre. A central element of the analytical framework applied is the underlying assumption that the strong dependence on external aid within the domain of flood management entails constant social and political struggles between actors involved in interventions, which has produced new arenas for struggle over issues and resources (Olivier de Sardan 2005). The article finds that this struggle for donor resources engenders a 'commodity approach' to flood management, which produces and legitimises certain practices and interests that work against the very objectives of flood management interventions. These include a political and personal appropriation of the flood response in Senegal and a reinforcement of the existing dichotomy between central government and the municipalities, where the strategic use of party politics to penalize decentralised actors from the opposition has long been a prevalent practice. Moreover, the article finds that it has occasioned a fragmented and complex institutional framework, with overlapping and competing institutions, where competencies and mandates are blurred.

In spite of the void produced by limited government achievements within the domain of urban flood responses, urban dwellers' struggle with perennial flooding does not take place in an institutional vacuum. **Article 2** examines how the governance of flooding is organized locally in the absence of adequate public services, infrastructure and protective regulations in peri-urban areas. The article analyses how community responses to flooding are mediated by complex and intertwined spaces of negotiation among diverse actors, where public services pertaining to floods – commonly provided by state institutions – are co-produced. The article investigates local governance in a poor peri-urban neighbourhood municipality of Pikine/Dakar from a 'real governance' perspective (Olivier de Sardan 2008), where public services relative to flood management are found to be governed by various combinations of individual, associative, municipal and aid-driven forms. This empirically grounded approach sheds light on the interface between service providers and users, which forms the production of collective services in contexts where government support is relatively absent. The article finds that a consequence of the inability of local and national governments to deal adequately with climate change-related flooding is that urban dwellers and their rulers invent new forms of governance. It is also found that, by reinventing the daily practice of public services and engaging actively in their provision, actors involved in the real governance of flood management are also manifesting 'active citizenship'. However, the co-production of flood-related services is also found to have the adverse consequence of excluding the most vulnerable groups from the local negotiating arena for flood mitigation services.

Given the inadequacy of state-level and municipal responses to adequately meet the public calls for help, **article 3** scrutinizes the coping and adaptation strategies that peri-urban dwellers develop in order to live with regular flooding in two peri-urban municipalities of Pikine. The article examines the local

responses to a global threat by identifying and categorizing local coping and adaptation strategies combining classification elements from Blaikie et al. (1994), Smit et al. (1999) and (Füssel 2007). The article finds that, in spite of their limited scope for action, poor urban-dwellers in precarious flood-prone environments are not simply passive spectators of floods and climate change. Dwellers apply a wide range of individual and collective strategies in order to minimize risks, withstand the impacts of disasters and adapt. A key finding is that these strategies cannot stand alone, as by themselves they may not adequately offset the derisory basic services and infrastructure which are forcing the urban poor to cope with significant levels of risk. The evidence from Pikine shows that maladaptive strategies are produced at the local level, as many coping and adaptation strategies initiated by urban-dwellers, as well as those supported by external actors, are unsustainable, have adverse impacts on the most vulnerable and reduce the incentives to adapt. A key finding is that, without a wide assimilation of all groups in decision-making processes locally, individual and even collective coping and adaptation strategies divert risks in time and space and may easily put the most vulnerable households at even greater risk.

Main RQ: How is the governance for urban flood management configured in Senegal at the national and local levels? and what are the consequences of such configuration?							
Sub Questions		Objectives	Methodology	Theory/concepts	Data collection methods	Conclusions	Status of article
ARTICLE 1	How have urban floods been managed in Senegal and why has this management not led to the results expected by the population?	Analyse the consequences of the significant development aid allocated within the field of urban flood management in Senegal, for the way it is configured and for the limited accomplishments in the domain.	Empirical-analytical methods of enquiry	Actor-oriented perspective and entangled logics perspective on planned interventions and (Long (2006)& Olivier de Sardan (2008)).	<u>Secondary data:</u> scientific articles, books, grey literature, news articles. <u>Primary data:</u> <ul style="list-style-type: none"> Informal conversations 20 qualitative explorative and semi-structured interviews with national actors in Dakar (ministries, commissions, experts, public-private organizations) 93 qualitative semi-structured interviews with local actors in Guinaw Rail Nord and Dalifort (CBOs, NGOs, municipal actors, households, companies, neighbourhood chiefs, imam) (See Appendix 1) Focus group interviews (7) with households and community group members. 	The substantial resources allocated to urban flood management and the resulting struggle for accessing these, have led to limited achievements within the domain of flood management in Senegal because it has engendered: <ul style="list-style-type: none"> a personal and political appropriation of flood management processes. A practise which is found to create a culture of rumours, distrust and apathy among actors involved in flood management; the reinforcement of the existing dichotomy between central government and decentralised municipalities; a complex and fragmented institutional framework with overlapping institutions, duplicate mechanisms and a competitive approach to flood management with very little transparency, including an ongoing 'negotiation' of competencies and interpretation of mandates 	Journal: 'Climate and Development' Submitted in June 2015.
	How are urban flood management services configured locally in the absence of	<ul style="list-style-type: none"> Conceptualise real governance Examine empirically how public service related to floods 	Case study of local governance of flood response in Guinaw Rail Nord.	Explorative and empirically grounded approach to everyday (real) governance,	<u>Secondary data:</u> scientific articles, books, grey literature. <u>Primary data:</u> <ul style="list-style-type: none"> Informal conversations 52 explorative and semi-structured qualitative interviews conducted 	<ul style="list-style-type: none"> Climate change impacts the daily (real) governance of public services. The organization of collective services pertaining to flood response is provided through the co-production among service users and providers, which often excludes the 	Journal: 'Progress in Development studies'. Submitted in March 2015,

I C L E 2	adequate public services, infrastructure and protective regulations and what are the consequences of such configuration?	are produced in a context of weak state capacity ▪ Analyse what the consequences of real governance are.		practical norms (Olivier De Sardan 2005)	with local actors in GRN (the same as those included above) ▪ 4 Focus group discussions ▪ participatory diagramming methods ▪ Observations ▪ Attendance at workshops and community meetings	most vulnerable groups from the local negotiation arena for flood mitigation services. ▪ The provision of flood related services does not rely on the efficiency of public institutions but rather on the capacity of the inhabitants to benefit from a variety of social networks, political communities and corruptive practices. ▪ The inability of local and national governments to deal with climate change related floods allows urban dwellers and their rulers to invent new forms of governance.	currently in review.
A R T I C L E 3	How do poor urban dwellers cope with - and adapt to - perennial floods in a context of weak state capacity? And are local coping strategies a stepping stone towards adaptation, or are they on the contrary likely to lead to maladaptation?	▪ Develop a classification framework for community based strategies. ▪ Identify local coping and adaptation strategies in a peri-urban context. ▪ Propose conceptualisation of maladaptation ▪ Analyse the prospect for maladaptation of local strategies in a peri-urban	Case study analysis of local coping and adaptation strategies in Guinaw Rail Nord and Dalifort.	Framework developed from diverse categorizations within the fields of climate change adaptation and disaster risk management, integrating elements from Blaikie et al. (1994), Smit et al. (1999) and Füssel (2007)	<u>Secondary data:</u> ▪ scientific articles, books, grey literature <u>Primary data:</u> ▪ 93 Qualitative explorative and semi-structured interviews conducted with local actors (NGOs, CBOs, municipal actors, companies, households) in GRN and Dalifort. ▪ 20 qualitative semi-structured interviews with national actors in Dakar (ministries, commissions, experts, public-private organizations). (See	▪ Poor urban dwellers employ a wide range of diverse strategies to cope with - and adapt to - perennial flooding, which have varying degrees of success sustainability. ▪ Adaptation strategies initiated by urban dwellers are often maladaptive by having adverse impacts on the most vulnerable and by diverting risks in time and space. ▪ Community based adaptation may not, by itself, compensate for inadequate public services. ▪ Public failure to support local strategies is thus forcing the urban poor to cope with disproportionate levels of risk and adopt maladaptive strategies.	Journal: 'International Journal of Climate Strategies and Management'. Forthcoming (accepted in March 2015).

		setting			<p>Annex 1).</p> <ul style="list-style-type: none"> ▪ 7 Focus-group discussions conducted with households and community groups members. ▪ Participatory diagramming ▪ Attendance at local workshops and community meetings ▪ Observations ▪ Photos 		
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Table 1: Overview of the research questions, theories, methodologies, conclusions and articles

2. Analytical framework

2.1 A state failure perspective

Until the 1990's, research on state-building and public services in Africa had commonly been carried out within the field of political science. Within this field a state-centric culturalist-traditionalist approach has long prevailed, the focus being on what characterizes the 'African state' (Boone 2003; Jourde 2009; Hydén, 2006; Médard 1991), where concepts relative to its cultural environment, such as kinship, ethnicity and shared values, are used to describe the *modus operandi* of the functioning of the state and bureaucracy. The focus of this approach is on the state as an entity, considered as a goal-oriented, centralizing and unitary actor distinct from society, in coherence with the Weberian ideal type (Hagmann and Péclard 2010). In this line of thinking, the state is viewed as an entity threatened by disintegration, where the idiosyncrasies of the neo-patrimonial African state are emphasized in all aspects of governance. The state is described as being infused by patron-client relationships which are undermining political institutions and bureaucratic structures. It is depicted as a 'quasi' state (Jackson 1990; Hopkins 2000), as 'failed' (Rotberg 2004), a 'shadow' (Reno 2000), a 'balloon', being 'hollowed out' (Hydén, 2006), and empty of popular legitimacy and administrative capacity. In sharp contrast, works by other scholars, who depart from this view, support an approach where indigenous methods of political accountability found in the social-political space should be institutionalised and not condemned (for example, Big Man politics⁷ or nepotism) (Kelsall 2011).

A main critique of the state failure paradigm is that, being primarily concerned with theories of the state rather than the state's empirical analysis, it generalizes and homogenizes a wide variety of diverse practices and fails to contemplate the wide variety of institutions that exercise governance in Africa, the changes experienced by African traditions, the effects of development assistance, and the innovations that are specific to African modernity (Olivier de Sardan 2008). At the same time, states are considered failed, not in their own quality – because of what they actually are – but based on a normative view of what they are *not* in comparison to Western states (Hill 2005). However, this does not mean that governance may not be influenced by neopatrimonial, clientelist and/or other 'informal' traits, but central to this critique is the claim that governance is not homogenous and thus cannot be generalized about, laying the emphasis is instead on the necessity for an empirically grounded and exploratory approach to its study (Migdal 2001), which is the underlying approach adopted in this dissertation presented in the following section.

⁷ A political leader who is judged by his subjects based on his capacities with regard to the clientelist redistribution of state resources (Kelsall 2011; Chabal and Daloz 1999).

2.2 An anthropology of public spaces and public action

The underlying theoretical approach applied in this dissertation is based on the anthropology of public spaces and public action that emerged in the 1990s. This is an approach in which conventional anthropological methods such as interviews and participant observation among stakeholders are applied to themes which were more commonly approached in the political science and the administrative and management sciences.

2.2.1 A 'real governance' perspective

Central to the anthropology of public spaces and public action is the claim that the lack of the state's capacity and resources in Africa does not mean that a void exists in its place. Rather, it has resulted in the negotiated character of public service delivery, involving both state and non-state actors. The practice of authority is thus ultimately contingent on the legitimacy of the specific institution, which is constantly being transformed through an ongoing process of negotiation and conflict (Lund 2007). As a result, public authority 'becomes the amalgamated result of the exercise of power by a variety of institutions, conjugated with the image of a state' where the practice of governance varies from place to place (Lund 2007). This underlines the need for a context-specific approach to examining governance. Given that public authority is no longer considered the exclusive competence of the state but is produced, influenced and negotiated by diverse actors, including donors, private actors, religious institutions, municipal agents etc., it may take multiple and diverse forms. Sometimes these different forms function in agreement and sometimes in competition or in direct disagreement (Lund 2006). Therefore, state institutions should be examined through the numerous formal and informal actors and groups in the field of public authority and the complex negotiating processes among them (Migdal and Schlichte 2005; Blundo and Le Meur 2009). The negotiations of the state are thus manifested in the everyday and informal negotiations which produce governance arrangements.

The official modes of governance, which are officially involved in the delivery of collective goods at the local level – the state, communes and associations – all face significant difficulties in terms of work organisation, financial capacity and human resource management at the local level. These bottlenecks are circumvented through the deployment of palliative forms of governance, as coined by Olivier de Sardan (2011b). This means that public services are governed by various combinations of statal, associative, individual, entrepreneurial and exogenous aid-driven forms, which altogether constitute the exploratory 'real' or 'everyday' (as opposed to idealised) governance approach of public services (Olivier de Sardan 2011b) applied in the thesis. These modes of governance are highly intertwined and function through an amalgamation of consensus and conflict at the local level. Migdal and Schlichte describe this networked form of governance as actors who are 'doing the state', which encompasses the 'diverse multiple actions of state actors as well as myriad of responses and interactions between state officials and non-state actors (Migdal and Schlichte 2005). Real governance is thus composed of a set of complex social and negotiating processes among multiple actors and groups (Blundo and Le Meur

2009), being thus shaped and negotiated in the street, the market and the press, as well as in the formal public decision-making arenas of community and local government (Hagmann and Péclard 2010). Real governance is therefore by nature fragmented and fluid, infused by contradictory and converging dynamics. This empirically grounded approach to governance, which sets the foundation for article 2 in this dissertation, thus sheds light on the modes of brokerage, mediation and translation which configure the interface between service providers and users and which thereby form the production of collective services. It enables an understanding of the diverse, changing and ambiguous processes through which the state establishes itself. Observing configurations of the mechanisms of everyday governance makes it thus possible to consider transformations of traditional centres of power and the creation of new configurations of public authority where the distinctions between the state and civil society are no longer valid (Blundo and Le Meur 2009).

As a result, informality is not viewed in opposition to the state. Instead, the state is a place of informality, where practices are not necessarily told or written but regulated through common routines (Olivier de Sardan 2008). The legitimate sphere of intervention of the diverse governance modes is thus not determined by a formal system of rights and duties and is not improvised in a vacuum either, being instead contingent on basic principles of expectations and feelings of obligations (Anders 2002). Given the discrepancy between the official norms of the state and public services and the actual practices of civil servants and users, official norms do not guide the behaviour of actors alone, but are accompanied by social norms (morally accepted *modus operandi*) and practical norms (informal rules of the game), which together configure real governance (Olivier de Sardan 2008). Practical norms are thus complementary, bypassing or even contradicting official norms, and they are thus essential to the examination of 'real governance' (de Herdt and Olivier de Sardan, 2015). The diverse modes of governance are also all linked to very diverse types of accountability, which may be bureaucratic, representational, reputational or financial in type (Olivier de Sardan 2011a). State and non-state actors involved in service delivery are thus subject to a number of different forms of accountability, which may even result in an excess of accountabilities (Blundo 2015).

Because of the negotiated character of public service delivery, the capacity to identify and impose decisions is a result of ongoing negotiations and is not intrinsic to the state (Titeca & de Herdt, 2011). This means that the results of this negotiation will not be uniform, but will depend on the power configurations of specific places at specific times. Given the multiple layers of governance operating locally, there is no consensus on what may be regarded as legitimate practices. Instead, multiple and sometimes overlapping practices are considered legitimate in the negotiating arena (Titeca and de Herdt 2011). Consequently, the quality, nature and coverage of public service provision depends on the permanent negotiation process that takes place between co-existing power poles, formed through mutual expectations and obligations. As a result, these negotiations do not take place among equal parties, 'but among heterogeneous groups with different assets and entitlements, both material and

symbolic' (Hagmann and Péclard 2010), which affects both who is involved in these negotiations and their outcomes and thus the quality of the service provided. In this sense, the provision of collective services is unavoidably linked to the issues of exclusion and inclusion in terms of access and control (Ribot and Peluso 2003).

2.2.2 An actor-oriented perspective

As described, the approach followed departs from the view of the state as a unified source of intentions, policies and coherent plans. Instead the state is viewed as a set of complex social and negotiating processes among various actors and groups (Blundo and Le Meur 2009). The conceptual framework applied in Article 2 considers that donor interventions play a preponderant and overlapping role in state interventions. As a substitute for the traditional anthropology of development, where the functioning and failure of the public administration is assigned to 'indigenous' attributes or 'culture contact', a more recent paradigm considers external aid and 'endogenous' resources as the same object of study (Bierschenk and de Sardan 2014). Consistent with the actor-oriented perspective (Long 2001) or the similar 'entangled social logics' approach (Olivier de Sardan 2005), development interventions are regarded as being part of ongoing socially constructed and negotiated processes (Long and Ploeg 1989), where actors exercise various forms of influence and hold diverging interests and conflicting motives (Bierschenk 1988).

Central to this line of thought is a critical view of the linear and rational thinking behind the ideal type of donor intervention, exemplified by the logical framework approach, according to which problems may be identified, followed by appropriate actions, leading in turn to predictable outcomes (Mosse 2004). Instead, consistent with the actor-oriented perspective applied, the influence of diverse actors who have divergent interests and conflicting motives, is central to the outcome of development interventions (Bierschenk 1988), where the unintended consequences are often more important than the intended ones (Ferguson 1994). Here the need to examine the interface between the two worlds is in focus. A central element to the analytical framework applied is therefore the assumption that the constant social and political struggles that occur between actors involved in interventions create new arenas for struggle over issues, resources, values and representations (Olivier de Sardan 2005).

Arenas are thus regarded as places of confrontation between actors over a shared issue, in which they mobilise social relations and deploy diverse methods to obtain specific ends. The existence of these diverse arenas suggests that interventions are utilized by actors to serve diverse interests (i.e. strengthening professional positions and personal networks, satisfying donor country constituents, political power, private gain etc.) through ongoing competition for different symbolic and material resources. This has a direct effect on interventions, which are thereby shaped by a variety of actors who compete over the opportunities made available, where power is used and mobilized according to their

various intentionalities (Gramming 2002). They are all in possession of diverse mandates and resources and operate within distinct structural constraints, according to particular social logics, which together define their unequal positions of influence and thus their room for manoeuvre within the arenas in which they operate. It is through an arena lens that interventions within the domain of flood management are addressed in Article 1, assuming that interventions are contingent on the interface between the two worlds, rather than strictly being the result of policy implementation failure, to be reduced by better and more effectively implemented policy (Mosse 2004), or uniquely dependent on cultural traits or 'indigenous' methods that permeate public management.

As objects of enquiry, arenas have spatial, social and temporal dimensions, which means that a key challenge is to trace where they are situated, who has access to them and how they occur. Arenas do not necessarily occur in distinctly demarcated settings, but may take place at different temporal scales and may therefore emerge between geographically distant actors, contexts and institutional structures (Long 2001). All arenas are also highly interconnected, which is manifested differently, according to the situation in question. This conveys the need to consider the forms of interaction between the actors involved, their respective reasoning, their hidden agendas and the practical strategies they adopt (Bierschenk and Olivier de Sardan 1997).

Having outlined the main theoretical framework adopted in this dissertation, the following presents the research design and methodology followed.

3. Research design and Methodology

'We stare at the amorphous mass we call data, and patterns begin to emerge.' (Lund, 2014)

3.1 A grounded theory approach

In order to answer the research questions outlined in Section 1.5, the framework underpinning the qualitative data analysis is based on some of the main tools of the grounded theory approach (Strauss & Corbin 1990). Grounded theory is often criticized for being unrealistic in its assumption that data may be interrogated from a theory-neutral standpoint (Bulmer 1979; Bryman 2012). This is considered unfeasible given the a priori knowledge about the social world that we as researchers or members of society are already in possession of. The assumption followed throughout this research is that my own observations from the field are theory-laden, not theory-determined or theory-neutral, as like most researchers I am to a certain extent influenced by previous scholarly work and past experiences. To put this in a nutshell: in contrast to the prescriptions of grounded theory in its pure form, I did not suspend my awareness of previous scholarly work and discipline and engage in the investigative stage of my research with an entirely open-mind, nor did I end up in Pikine/Dakar by pure coincidence. The process followed in analysing the data was thus neither purely inductive nor deductive, but a combination of both, where 'theoretical questions help to *deduce* critical areas of inquiry, and detailed field research of an *inductive* nature allows us to investigate concrete dynamics' (Lund 2014).

Acknowledging this, the key elements and tools applied in this dissertation are nonetheless based on grounded theory – accepting that methods are not always as systematic as science claims (Feyerabend 1975) – including the application of an iterative strategy for linking theory and data. A key aspect of grounded theory is the generation of concepts, which are fundamental to the building of theory and which may be seen as general ideas that drive the research process (Strauss & Corbin 1998). Here Charmaz's more recent constructivist position on grounded theory is used, where categories, concepts and theoretical analysis are found to emerge from the researcher's interaction with the field and inquiries about the data (Charmaz 2000). This stands in contrast to earlier objectivist grounded theory approaches, where categories and concepts were considered inherent in the data, just awaiting the researcher's discovery (Bryman 2012). Maintaining a close connection between data and the development of conceptualizations was enabled through an on-going coding process (see Section 3.4), where data were 'broken down' into distinct parts – concepts and categories which were given names – allowing the process of going back and forth between data and theory, and tracing patterns and causal pathways throughout the analysis. A very succinct and accurate explanation of when results and solutions emerge from this process – which fully reflects my own experience – is formulated by Lund:

'sometimes when it happens it happens not simply by gradual, linear, theorizations but when enough concepts, enough materials, and enough inspection produced momentary clarity' (Lund 2014).

3.2 Ethnographic approach to conducting fieldwork

'Only the person who sleeps in his own bed knows if there are fleas or not'
(Wolof proverb cited by interviewee in Pikine)

The ethnographic fieldwork was conducted in two municipalities of Pikine (Guinaw Rail Nord and Dalifort) and in Dakar, Senegal, in November 2012 and from January to April 2013. Ethnography is commonly characterized by the application of a holistic approach, addressing processes, relationships, connections and inter-dependencies (Mikkelsen 2005), which were key elements in the research. As my knowledge and understanding of these issues developed, the focus of my research was progressively modified, which means that a priori assumptions were constantly challenged and altered throughout the fieldwork journey. Moving back and forth between the data and slowly sharpening theoretical concepts was thus at the heart of my ethnographic fieldwork experience, where different types of data and theoretical directions became relevant as the research proceeded.

In the course of my fieldwork, I was increasingly made aware that my research questions could be tackled meaningfully only if I were able to gain 'access' to some of the deep-rooted conflicts and/or controversial matters which are not easily and immediately perceived by strangers. This was at the outset quite challenging in Pikine, whose residents expressed a certain fatigue towards the numerous experts, development agents and consultants they had seen passing through their neighbourhoods over the years, which they felt had resulted in very few benefits for them. As a relatively short-term and uninvited visitor, a main challenge was therefore to be welcomed 'behind the scenes' and reach beyond the appearance of solidarity and harmony, which was the initial representation I was offered – a façade which is often put up by residents in similar contexts for the sake of ethnologists and development agents, as described by Bierschenk and De Sardan (1997). The research traditions that have inspired the analytical framing of this dissertation (see Chapter 2) have equally motivated the methodological approach followed. The struggles between actors and the relations and interfaces between them have therefore been at the heart of the methodological approach applied. As a result, approaching the data-gathering process through a conflict 'lens' was helpful in uncovering some of the underlying issues which normally may not be easily discernible. As Bierschenk and Olivier de Sardan argue (1997): 'To speculate on the existence of consensus is a far less powerful and productive research hypothesis than to conjecture the existence of conflicts.' Accordingly, conflicts may represent indicators of social change and suggest new configurations of public authority. They may thereby constitute a point of entry beyond the façade. That said, the intention was not to discover areas of conflict for the sake of

conflict, but rather to use it as instrument for a more authentic understanding of the deep-seated matters inherent in the localities where the fieldwork took place.

The main challenge was therefore to seek credibly to characterize the numerous voices and contested realities at play. The development of a certain level of trust and straightforwardness between respondents and myself was therefore a prerequisite for the collection of meaningful data. This was attempted methodologically through a number of diverse approaches. At the outset, I spent substantial amounts of time explaining the purpose of my presence (both before interviews or focus groups and after). I presented the positive aspects of participating, including the importance of exposing the realities encountered by the populations living in these areas, in their own voice. Moreover, I attended diverse community-based activities. In addition to the qualitative interviews and focus group sessions I conducted, I attended neighbourhood meetings, workshops arranged by the municipality, traditional tea-drinking, family dinners, the meetings of community-based organizations, and prayers, and I spent time walking around engaging in random informal conversations with people and observing the daily life of the residents. In some activities I was an active participant (i.e. traditional tea-drinking), in others an observer (e.g. prayers). On many occasions, I visited the same people several times, often only for informal conversations. Realistically, given the time and resources available for doing the fieldwork, it would be optimistic to expect the development of trust with all of my respondents. However, by getting used to my presence, a relatively relaxed and natural atmosphere developed, which in most cases was fruitful for open and sincere interviews. In general, participation in the research was considered positive by participants, giving them the opportunity to express their opinions and for some of them to unburden themselves of some of the problems inherent in their living situations.

3.3 Limitations and biases

Although the research strove to triangulate the data from multiple primary and secondary sources, a number of potential biases should be taken into account which may arise when conducting this type of research. Here, a critical reflection on my role as a researcher in the generation of knowledge is essential. I am alluding primarily to two things. First, the interrelationship between myself as a researcher and my respondents has an effect on the knowledge that may be drawn from the field. Notwithstanding the efforts that were made to minimize biases and ensure the quality of data, language differences, the existence of different cultural norms and interpretations, and the filtering of information through an interpreter and transcripts are all elements that should be taken into account. Secondly, the same is true of the *a priori* that I, as a researcher, meet the world with. The very choice of particular concepts orients the inquiry by shedding light on particular dynamics, processes and relations, while disregarding others (Lund 2014).

In order to meet these concerns, explicit reflexivity as a methodological principle has played a role in guiding the research process. This entails focusing on the context of knowledge construction, including

the ways in which the products of research are influenced by the people involved in (and the process of doing) research (Davies 1999). I have been particularly attentive to the effects that I, as a researcher/woman/stranger/white person etc., may have on the data gathering process and its products. Given the context and previous experiences of the local actors in question, the obvious example is how I may be instinctively viewed as an outsider who may be proposing a project or some kind of benefit to participants. Another example is the reflexivity which is inherent in the process of informing participants about the aims of the research, which may thus influence the conduct of the research itself. While this is inevitable, being conscious about these latent 'constructions' has been central to the way I have conducted and conveyed my research, as well as to my interpretations. Although this influence is unavoidable, awareness of these issues is a first step. A second step, taken to pre-empt some of these concerns, is to attend to the principle of being open about my values and methodology (Mikkelsen 2005), to be 'as inclusive, honest and open as possible in one's observations, interpretations and inferences' (Olivier de Sardan 2008), and to be transparent about all steps of the research process, all of which this entire section endeavours to do. The following section explains the processes of the development of concepts and categories through coding, which was at the heart of the analytical process.

3.4 Coding

With the aid of Nvivo qualitative analysis software, the process of coding was an essential first step in the generation of concepts and categories. Codes include labels given in the researcher's own terminology, as well as 'in vivo codes', which are direct citations in the natural language of the people interviewed. Concepts are considered to be the 'building blocks of theory' (Strauss and Corbin 2011) and may be seen as general ideas that drive the research process. Concepts are transformed into categories when they represent real-world phenomena. The main challenge of the coding process was to identify key concepts and then deconstruct and operationalize them into observable empirical elements. As a result, the process of upholding a close connection between data and conceptualizations (a prominent aspect of grounded theory) in order not to lose track of the link between concepts and categories was essential. This was done by applying two distinct forms of coding: initial open coding and selective or focused coding (Charmaz 2006).

First, open coding was conducted to support the process of acquiring an initial impression of the data and identifying or producing core concepts. Coding was not used as a fixed and linear process of locating predetermined codes, but instead as a fluid and flexible process for the generation of new ideas which were the object of ongoing revision. During that stage, numerous codes were identified to support the process of organizing the significant amount of data, and coding was used to conceptualize and compare data. Examples of concepts which emerged during the open coding phase include: informal governance, legitimacy, accountability, social capital, trust, marginalization etc. Some were sustained, some were transformed and others abandoned during the subsequent coding phase. The

advantage of applying open coding is that the data were approached with an (to the extent possible) 'open mind'. The disadvantage was that this resulted in a significant and at times overwhelming amount of diverse codes, which were challenging to keep track of.

As a result, the second stage of coding was essential, which entailed a closer reading of the data, through selective coding. During this phase, the data were re-explored in order to determine categories, with prior assumptions and concepts being revised and refocused and categories emerging. Coding then took the form of an iterative process of identifying the relevant categories, determining the most common ones and those most revealing about the data, and thus continually reconsidering the relevance and similarity of certain codes. New codes emerged, while others were congregated into core categories or split into subcategories, and yet others were abandoned.

Nvivo coding was also applied during the literature review, where the software helped organize the important amount of secondary data, which were coded according to themes, theories, arguments, geographical contexts, research approaches etc. This helped to gain a structured overview of the fields of research and facilitated the process of locating the secondary data at later stages of the research.

The following section introduces the case study approach applied in the thesis.

3.5 A Case Study approach

The case study method has the potential to capture the ambiguity of real-life situations and to test views directly with regard to phenomena as they unfold in practice (Flyvbjerg 2006). Moreover, as Yin argues, 'in relatively less-known areas, where there is little experience and theory available to serve as a guide, intensive study of selected examples is a very useful method of gaining insight and suggesting hypotheses for further research' (Yin 2003). The rationale for applying a case study method is thus the need for more empirical studies, given the relative novelty of the research area. Case studies are most commonly associated with the in-depth analysis of a particular community, organization or event (Bryman 2012). Lund (2014) describes case studies as 'an edited chunk of empirical reality where certain features are marked out, emphasized, and privileged while others recede into the background.' The 'chunks of reality' gathered by means of the data thus constitute the case and serves as a tool for the researcher's attempts at generalizing and theorizing.

A common critique of the case study approach is exactly that one cannot generalize on the basis of individual cases and that doing so may therefore not contribute to scientific development. In contrast, Flyvbjerg argues that formal generalizations are overvalued as a source of scientific development, whereas 'the force of example' of in-depth case-study research is underestimated (Flyvbjerg 2006), which may also enter the collective process of knowledge accumulation in a given field. In-depth case studies may contribute to knowledge generation through their analytical generalizability (also called

theoretical generalization (Mitchell 1983)), which is found to be viable from single case applications, as argued by Yin (1994). The central question is thus not whether the findings can be generalized to a wider universe but how well theories and concepts are generated out the findings. They may also contribute with new knowledge by means of their resonance with other cases, in different localities and/or different times. These need not necessarily be similar cases, but they should contain elements which resonate between them (Lund 2014).

Given the exploratory nature of the research design applied in this dissertation and the lack of detailed preliminary research due to the relatively novelty of the field, the type of case study applied is an exploratory case study. This type of case study is adequate in situations where not all the research questions are defined beforehand and where they are altered in the course of the research process, consistent with the grounded theory approach followed. Against this background, detailed case studies of local response to flooding in two flood-prone municipalities in Pikine: Guinaw Rail Nord (GRN) and Dalifort in Pikine constitute the basis for the analysis in this dissertation. The case studies applied are thus concrete (between real people in an actual place) and specific (to one place, in a circumscribed slice of history). The case studies shed light on the coping and adaptation strategies adopted by local actors during all phases of a flood event (article 3) and the prevailing local governance mechanisms in GRN in particular (article 2). Article 1 examines the national configuration of flood management, which also provides some background for the cases studied.

The following section presents the rationale for the choice of case studies, followed by a description of the underlying causes for flooding in the localities under study.

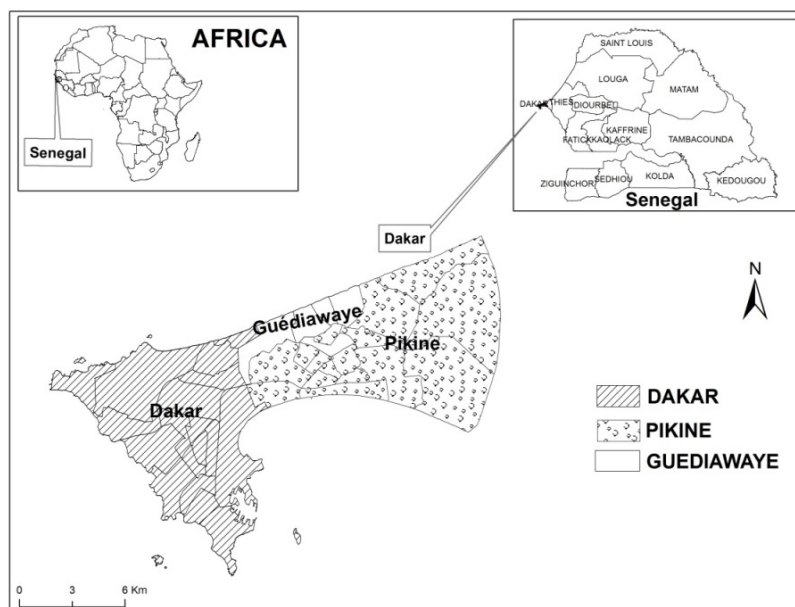
3.5.1 Case study area

The choice of Senegal was based on its representativeness of countries in the West African region in terms of susceptibility to perennial flooding in peri-urban areas, as well as my prior knowledge of the country, its culture and language.

Providing a standardized definition of peri-urban has proved a challenging task. Although there is not one single definition of peri-urban, this thesis will limit the focus to those areas which are defined within urban and development studies as transition zones, the rural–urban fringe (Simon 2008) or areas of spontaneous and unplanned development (Browder et al. 1995). In Senegal no consensus exists on what constitutes a peri-urban area (Fall et al. 2008), and the national statistics agency (ANSD) does not differentiate between the two notions.⁸ In Senegal, peri-urban zones are alluded to using many different designations, often pejorative ones. These are described both by state actors and in official reports in Senegal as slums, marginalized neighbourhoods, unsanitary slums (*taudis insalubres*) (NAPA 2006), irregular neighbourhoods, spontaneous habitations, shanty towns (*bidonvilles*) (UNHABITAT 2008),

⁸ Agence nationale de la statistique et de la démographie (ANSD).

working class neighbourhoods (*quartiers populaires*) (ADEPT 2010), or irregular, floating and unhealthy settlements (Thiam 2011). By the same token, peri-urban dwellers are commonly portrayed as powerless and dependent victims and/or as a problem which should be eliminated. Phrases like ‘the psychosis of floods’ (Gueye 2013), the need for ‘the eradication of slums’ (NAPA 2006), and descriptions of the helplessness, sadness, desolation and destitution (Fall and Diedhiou 2013) of residents who are given a diversity of labels such as ‘résignés’,⁹ ‘sinistrés’,¹⁰ ‘déguerpis’,¹¹ or ‘marginalisés’¹² are widespread. The population groups living in these hazardous areas are rarely treated as citizens with rights and legitimate demands who are in possession of resources and skills of their own. As the most densely populated zones in the country, with a surface occupation of 43 per cent (UNHABITAT 2008), it is paradoxical that these areas are officially labelled ‘zones non aedificandi.’¹³ This is especially the case given that half of the population of Senegal lives in urban areas, of which over 76 percent are classified as unplanned settlements (GFDRR et al. 2014). The peri-urban areas of Dakar are defined here as the suburbs of Guédiawaye and Pikine (see Map 1), located on the outskirts of the capital.



Map 1. Location of peri-urban areas of Dakar: Guédiawaye and Pikine, source: author

Considering these peri-urban areas, two municipalities of Pikine, Guinaw Rail Nord (GRN) and Dalifort (see Map 2), were selected to constitute the basis for the analysis. A key challenge in making this selection was that acquiring all the knowledge about the hypothetically relevant areas for conducting the research required a thorough insight into the local context of a sort that is often

⁹ Resigned.

¹⁰ Casualty, victim.

¹¹ Evicted.

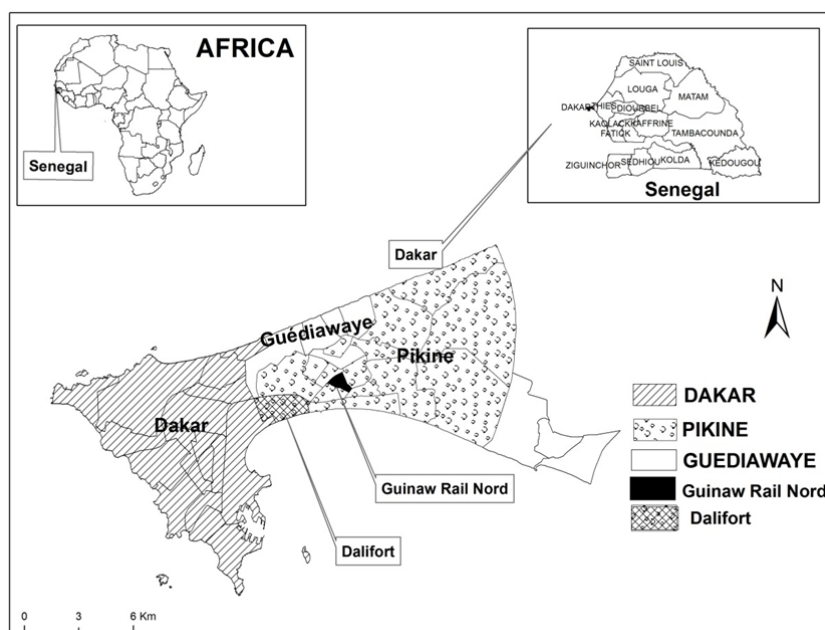
¹² Marginalised.

¹³ Zones unsuitable for construction.

acquired during the entire research process. This meant that it was not possible to gain extensive knowledge of all the hypothetically pertinent areas that may have constituted the foundation for the selection. Consequently, other equally relevant case areas may have been omitted. The final choice was based on the following criteria:

- municipalities demarcated by administrative borders (*communes d'arrondissements*),
- being situated in *non edificandi* and underserved peri-urban zones close to the capital,
- where a large percentage of residents live in informal settlements, sharing similar land tenure conditions,
- and that have been the municipalities most severely affected by recurring floods during the last ten years.

Additionally, there are practical considerations, which also have influenced the final selection of cases, for example, accessibility to the areas and the availability of key informants (municipality and local actors). The final choice of the municipalities of Guinaw Rail Nord and Dalifort in Pikine was based on all of these considerations.



Map 2. Location of Guinaw Rail Nord and Dalifort in Pikine, source author

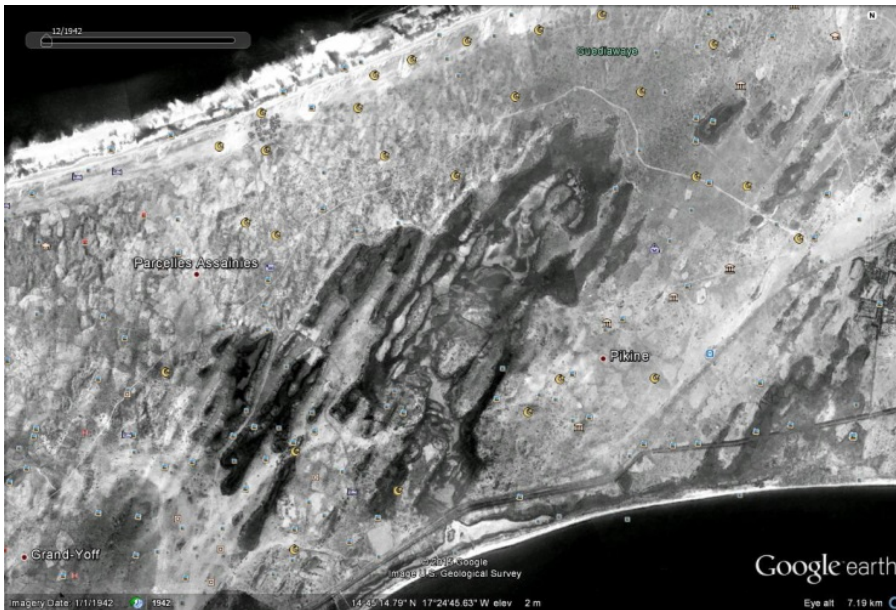
3.5.2. Underlying causes for recurring flooding in Pikine

The underlying causes of urban flooding in the peri-urban areas outside Dakar are complex and consist of a combination of natural as well as human factors (Mbow et al. 2008). These areas developed both as a result of an administrative decision to evict residents of Dakar city centre's irregular neighbourhoods (Thoré, 1962) – also called *déguerpissements*¹⁴ – and as a result of extensive and uncontrolled rural–urban migration. The latter was an outcome of the extensive droughts of the 1970s, when, because of deteriorating climate and soil conditions for agriculture, rural populations were forced to pursue alternative livelihoods (Fall et al. 2005). As urban sprawl grew beyond the control of the authorities, poor populations had no other alternative than to settle in hazard-prone lowlands. Peri-urban dwellers are therefore commonly subject to unequal and inadequate access to housing (Diop, 2004; Yuen & Kumssa, 2010).

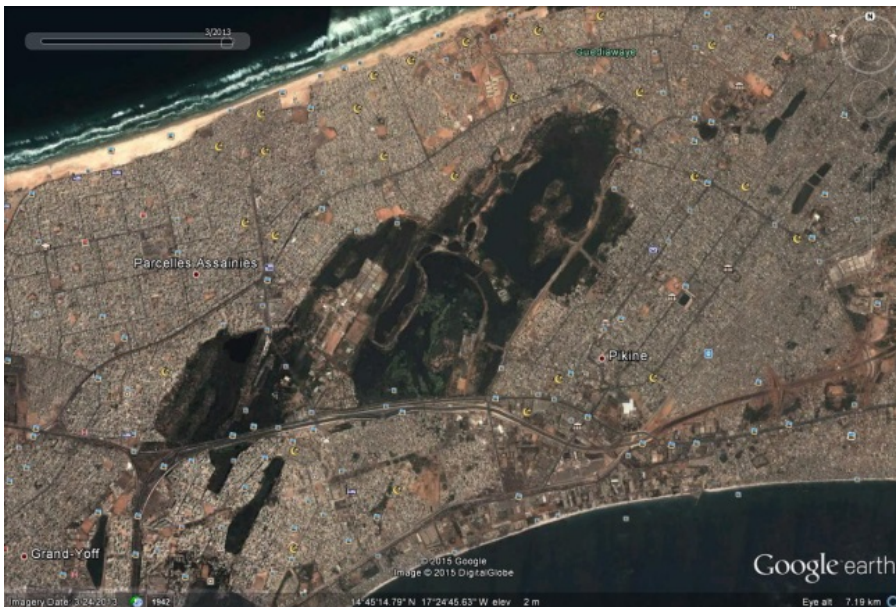
The illegal occupation of the land – also called *occupation irrégulière* in Guédiawaye and Pikine – was, and to a large extent still is based on parallel land-ownership arrangements rooted in customary law (*droit coutumier*), where the first occupants of the neighbourhoods (typically the *chef de quartier*) allocated the parcels for sale. Later, some residents received a fifty-year right of occupation against payment for the plot (Fall et al. 2005). Presently, tenure conditions differ from municipality to municipality and from house to house. As a result, because of a constant threat of eviction and poverty, occupants have often not used permanent material to build their houses (Durand-lasserve and Ndiaye 2008).

Because these zones developed without any urban planning, the rapid growth in construction obstructed the natural drainage for water evacuation, resulting in the permanent saturation of the ground because of the decrease in the area open to infiltration by water (Lo and Diop 2000). The rapid construction growth's obstruction of natural drainage for water evacuation is observable from a comparison of the Grande Niayes area of Pikine (dark areas, consisting of dunes and depressions) in 1942 (aerial photo 1) and in 2013 (aerial photo 2).

¹⁴ Designation used in West Africa for state-ordered evictions of residents even when dwellers have constructed a house or cultivated the land. The term differs from 'expropriation' in the sense that such residents receive no compensation for their eviction.



Aerial photo 1. Grandes Niayes de Pikine 1942. Source: Google Earth.



Aerial photo 2. Grandes Niayes de Pikine 2013. Source: Google Earth.

In addition, climate change-induced increases in the volume and intensity of rainfall, near surface water table conditions and obsolete sanitation systems, with insufficient pipe diameters, are also contributing to the increase in the occurrence of urban flooding (Mbow et al. 2008; Government of Senegal et al. 2010). As a result, flooding has become a persistent phenomenon in Pikine and Guédiawaye, with new occurrences reported almost annually since 2000 (Guha-Sapir et al. 2014) (see Table 2).

Year	2000	2003	2004	2005	2006	2008	2009	2010	2011	2012
No. of people affected by floods in Dakar	42000	50300	200000	350000	11000	268947	500000	320000	650000	264000
Average precipitation (mm)	353	297.3	228.2	663.4	421.1	511.5	356.3	576.5	-	-

Table 2. Occurrence of flooding in Dakar and average precipitation based on sources from: (UNISDR, 2013; OCHA 2012; GFDRR et al. 2014).

The impacts of floods are numerous, including deaths, water pollution, illnesses, the loss of earnings and jobs, damage to buildings and infrastructure, and increases in transportation costs (République du Sénégal et al. 2010). Other adverse effects felt by inhabitants include the disruption of school attendance and the destruction of mosques, markets and other places for community gathering (Thiam 2013). Poor urban dwellers therefore suffer from the devastating consequences of living in repeatedly flooded neighbourhoods: with poor health and inadequate housing conditions, family fragmentation and insecurity, their vulnerability is significant and increases with every new flooding event. Moreover, these areas are typically underserved, with poor basic infrastructure in terms of sanitation, waste management, storm water drainage and ineffective land-use policies (Diouf 2009; GFDRR et al. 2014), contributing overall to exacerbating the impacts of floods.

Having delineated the background for the choice of study area and for the recurrent occurrence of floods in peri-urban areas, the following section depicts the data collection process.

3.6 Data collection: process and techniques

The data production process took place in six phases. These are depicted clearly below for the sake of clarity, but they entail some back and forth movements and overlaps.

1. A preliminary study phase in which secondary literature was reviewed, including scientific articles, books, reports, surveys, memoirs and policy statements etc. Nvivo software was used to structure the literature review and acquire an initial overview of potential themes of interest to the research.
2. An exploratory field trip to Dakar was conducted in November 2012, where a broad range of relevant stakeholders (experts, government authorities, NGOs, CBOs etc.) were interviewed in order to determine the relevance of some preliminary ideas and themes. The objective was also to explore potential new areas of interest. Moreover, initial contacts were made with national and municipal actors, during this pilot field trip, where the nature of the study was explained and arrangements for subsequent visits during the actual data collection phase were discussed. There were also collaborative partnerships with the University of Dakar and visits to potential

sites to obtain more information regarding case study area selection and the local context. The pilot field trip also served to test some interview guides and techniques, as well as providing some important lessons for the subsequent phase. Finally, a number of practical arrangements were made, such as engaging an assistant, planning transport and place to live etc.

3. The primary data produced during the pilot field study was processed and analysed with the aid of Nvivo software for qualitative research.
4. A second literature review phase was undertaken to incorporate some of the insights gained during the preliminary data collection.
5. The primary data collection took place from January to April 2013 in Dakar and Pikine, Senegal. Informal conversations, exploratory and in-depth semi-structured qualitative interviews, focus-group sessions, participatory diagramming methods, photos and direct observations constitute the main bulk of the data production methods. The qualitative data were collected locally at the household and local actor levels (i.e. municipalities, NGOs, CBOs, neighbourhood chiefs etc.), as well as at the national level in ministries, government and semi-public institutions, international organizations and research institutions in Dakar. Moreover, reports, books, memoirs, scientific and newspaper articles and documentaries only accessible locally were collected. In total the data produced stem from 93 interviews and seven focus-group discussions conducted with local actors at the household and institutional levels in Guinaw Rail Nord and Dalifort, attendance at local workshops, prayers, family dinners, CBO meeting and 20 interviews conducted with national actors (see Annex 1).
6. The primary data were then processed and analysed with the help of Nvivo Software (See section 3.4).

3.6.1 Qualitative interviews

I started my work in both municipalities through official channels, which started with a visit to the mayor, who introduced me to municipal employees. In turn, the latter introduced me to neighbourhood chiefs, who are by decree¹⁵ the official intermediaries between municipalities and peri-urban populations. The neighbourhood chiefs then presented me to some of the key actors and several households in each municipality. After this initial introduction, I was able to bypass official actors and enter into direct contact with residents and community groups independently, with help from my assistant. As a result, the respondent sampling techniques varied from chain sampling (or snowball sampling) via simple random sampling to random walking (Mikkelsen 2005) in the course of the data collection phase, as my local knowledge improved and my local network was extended. The sample was ended when no new information was supplied from additional respondents.

¹⁵ Decree n. 92-1615 of 20 November 1992.

Qualitative explorative and semi-structured interviews were conducted with support from an interview guide, which was adapted to each category of respondent. The interviews were open-ended, in order to leave room for new and unanticipated issues to arise during interview sessions. Interviews covered issues such as personal background for living in the area, what a day during flooding looks like, personal perceptions of municipal and state response to flooding, the history of activities of municipal flood response, the view of municipal actors on state interventions, the formal functions of municipal actors, the interaction between actors etc.

Throughout the data collection period, analytic memos were developed (both handwritten and in Nvivo) based on my field notes and ideas emerging upon completion of the daily interviews. Given the intensity and quantity of daily inputs and the many people I met and interviewed on a daily basis, taking time for daily reflections and the extraction of analytical themes out of the data collected was an essential part of the daily routine. Taking a step back from the data on a daily basis helped to gradually delineate the puzzles and served as a helpful guide to future interviews. Consequently, the 'branching and building' strategy (Checkel, 2006) was used to structure the content of the interviews, the results of early interviews being applied to restructure and refocus the types of questions posed at later points. Although some reticence was felt at the beginning of some interviews, interviewees became more open in the course of the interviews, most of which were characterized by an atmosphere of informality and ease. However, some practical circumstances influenced the way the interviews unfolded, such as noise levels, disruption by curious passers-by, interruption for prayers etc. A basic factor such as where I was seated by my interviewees was also found to have an effect on the way interviews unfolded and on the atmosphere created. Although I strove to sit close to my interviewees in the same manner as they did (either on the floor, a chair, a bed or a bucket), on a few occasions I was kindly given the only chair available in the household, which out of politeness I could not refuse, although I experienced it as a barrier to an informal and equal dialogue with respondents. During interviews and focus-group sessions, I was not aware only of the actual answers given by my interviewees. Sometimes silences, expressions and implicit glances among respondents were as explicit as words, and this was taken into account in the rest of the interview.

At the local level, most interviews were conducted in Wolof, translated from and to French by my assistant. At the national level, all interviews were conducted in French. All interviews were recorded and almost all of them were transcribed, either from Wolof to French or directly from French. The transcription process started after the first half of my fieldwork and continued upon my return to Denmark. Finding a suitable person to complete the transcription within the budget and timeframe planned for this task proved a challenge. Eventually, a retired person who had experience of transcription from his professional life, as well as a proficient knowledge of French and Wolof, was taken on for this task.

3.6.2 Focus-group sessions

Seven focus-group sessions were organized in Guinaw Rail Nord and Dalifort, which unfolded very differently. At the outset, I attempted to limit the number of participants to approximately five people in order to keep the session manageable and leave room for translation. However, this was not possible on all occasions, as focus-group participants had sometimes invited other people to join in. On one occasion, where the session took place in an open, outside space, new people gradually joined the discussion. Although more chaotic, this 'natural' expansion of the focus group added to the dynamism of the discussions and made the session very lively, informal and interesting, while including people who may not have been reached otherwise. The focus-group sessions were structured as follows. First the scope of the research was introduced, followed by some general questions about the local context and the problems attached to perennial flooding as perceived by participants in order also to warm up for the subsequent exercise. Then, inspired by the Venn diagram, which is commonly used to depict participants' sense of relations between local groups or organisations (Mikkelsen, 2005), participatory diagramming methods were applied by the participants, who were asked to depict the groups and individuals directly and indirectly involved in flood management in their community, their opinion of them and their sense of belonging or relationship with them. The drawing exercise was led by a voluntary participant, and I only intervened with supplementary questions or comments if the discussions ceased. After the diagramming sessions, issues which came up during the exercise were discussed further, and additional questions were posed. At the end of the focus-group sessions, participants were encouraged to pose questions about my research and share potential comments or questions about the focus-group exercise. Focus-group exercises were conducted both in Wolof and French, with translation support from my assistant. All focus-group sessions were recorded and when needed translated from Wolof into French before transcription.

4. Conclusions

This dissertation has set out to examine how the global threat of climate change is handled in the context of a developing country with poor financial means by examining how CCA and DRR governance processes are translated at the national and municipal levels, with respect to recurrent flooding in urban Senegal. The findings presented in this dissertation highlight the need for a more profound understanding of the contextual processes, interests and mechanisms at play in CCA and DRR interventions and governance at the national and local levels. By applying theories and concepts from the anthropology of development literature on public spaces and action, this dissertation has contributed to widening and differentiating the research perspectives on CCA and DRR.

Climate change-related floods are a critical issue in Senegal, but climate change not only affects the daily lives of millions of people among the most vulnerable, it also impacts on the daily governance of public services. By providing an in-depth analysis of the configuration of national and municipal governance for urban flood management in Senegal, the dissertation has shown that the state is far from being the sole actor acting on floods; public authority no longer lies solely with the state, but is exercised and influenced by diverse actors at various scales, including donors. The ability to respond to floods is thus maintained through specific processes and mechanisms, which are largely formed outside the realm of the state at the municipal level and with significant influence from development aid at the national level. This is found to have far-reaching implications for the way national governance is configured, as well as for how flood-related services are produced and provided for, and by, the urban poor.

The approach to urban flood management followed in Senegal during the last fifteen years has not led to the results expected by the affected population, state institutions and the donor community. A number of donor reports have emphasized the need for more effective coordination mechanisms, a better integration of flood management in urban planning and the need for a horizontal integration of flood management and climate adaptation across sectors. However, the underlying socially constructed processes involved in flood interventions, which may potentially influence the approach followed in the country and the lack of achievements of flood management interventions, have not been addressed. By examining some of the numerous and conflicting motives and interests at play among actors involved in flood management, it has been shown that these have implications for the way policies and programmes have been tackled. The insight into the ‘multiple realities’ that have influenced the different interpretations of flood management interventions has thus shown that the allocation of significant development funding to address and prevent the devastating impacts of floods in the country, has contributed to the political and personal appropriation of flood management-related processes. This situation is found to have reinforced the divergences between central government and

municipalities, where the prospects for municipalities to play an actual role in addressing floods are marginal. Another consequence is a fragmented and institutional framework, with overlapping and competing institutions, duplicate mechanisms and the ongoing 'negotiation' of competencies and interpretation of mandates. This has contributed to the prevalence of widespread rumours, distrust and apathy among the actors involved in flood management, which is also found to affect the management of floods. These consequences of donor interventions are thus not only unintended as Ferguson (1994) coined it, but to a large extent also counterproductive to achieving the projected adaptation to floods.

Although the limited results in the domain of flood management are forcing the urban poor to cope with disproportionate levels of risk, the dissertation has also shown that, in spite of their limited means they are not simply passive victims of climate change. The identification and analysis of local coping and adaptation strategies have demonstrated that the void left by the weak state's capacity to fight flooding in urban areas is forcing local actors to improvise and deploy a diversity of individual and collective strategies in order to minimize risks, withstand the impacts of disasters and adapt. In a context of weak state capacity, this allows them to react to perennial flooding, although their usefulness and sustainability is somewhat limited. While to a certain extent these strategies enable urban dwellers to endure the consequences of recurrent flooding, they are often unsustainable and are not equally beneficial for all. Given the precariousness of their situation and their limited resources, the urban poor are logically more concerned about developing short-term coping strategies than on the implications of these strategies for long-term adaptation. They are left with few possibilities for adaptation, which makes them increasingly vulnerable to future floods. Maladaptation is thus produced by local actors in the form of the application of local strategies (such as backfilling) that have undesirable impacts on the most vulnerable population groups. By diverting risks in time and space, these local responses may thus not, by themselves, compensate for the lack of public services.

Although public services related to floods are inadequate, the analysis of real governance in Pikine has shown that they are still being provided. As such, weak state capacity is not equivalent to non-existent or ungoverned collective services. As we have seen, the impacts of climate change are driving the residents of poor flood-prone urban areas to reinvent the daily practice of public services by engaging actively in their provision. By examining real governance in Pikine, local governance was found to be much more than an unambiguous matter of official bureaucratic authority, as the provision of flood-related services to a large extent does not rely on the efficiency of public institutions. Rather, the ability to respond to floods is maintained through a mixture of various governance modes (statel, associative, individual and aid-driven forms), depending on the capacity of municipal actors and residents to combine these, through for example co-production by service providers and users. This ability is thus dependent also on the adoption of practical norms, by producing flood-related services which sometimes go against the official rules. These particularities of the governance configuration for flood

management related services found in this dissertation also extend beyond the borders of Pikine and Senegal, with common traits in the governance of public services found across West African countries such as Benin, Niger, Mali and Burkina Faso, where community associations and municipalities for example, share similar modes of functioning and difficulties (Olivier de Sardan 2014).

The reinvention of the daily practice of services in the area of flood management was found to have several important implications.

On one hand, the use of co-production through practical norms, such as the informal payment of a public service, may be considered a necessary requirement, resulting from the poor capacity and lack of financial resources available for public service delivery. By providing an environment favourable for actors to take ownership of central processes, co-production for flood services allows municipal agents to exhibit agency, despite the very limited resources at their disposal. On the other hand, by introducing a price barrier to service delivery, structural inequalities are reinforced locally. The practical norms developed locally as a response to weak state capacity and difficult life conditions are not beneficial for voiceless citizens in situations in which emergency situations cement established power structures. Because of the negotiated character of public service delivery, the most vulnerable segments of the population have more difficult access to flood-related services, as they are normally situated outside these negotiating arenas. Finally, the discrepancy between official norms and effective practises, seen when poor residents engage in the provision of public services by going against the rules, also means that they become active citizens. Local measures may thus be regarded not only as adaptation responses to climate change or deficient public service delivery by weak institutions, but also as a manifestation of active citizenship.

The explorative and empirical approach to governance adopted in this dissertation has demonstrated the need for a broader and more representative approach to understanding how the state and its actors function, than the one advocated in the state failure paradigm, exposing the relevance for an empirical analysis of the state. For theories of the state to be applicable to the distinct realities of African countries, they need to be representative of the complex ways through which the state is translated and perceived locally. The approach taken in this dissertation has thus conveyed a critical stance vis-à-vis the dogma of 'good governance' advanced by international development experts as well as towards cultural analysts of the African state. It has been argued that these fail to take into account the wide variety of institutions that exercise governance in Africa, the changes experienced by African traditions, as well as the effects of development assistance (Olivier de Sardan 2008). By analysing the production of public services, the dissertation has shown that the myriad of social actors and organizations engaged in the diverse governance modes are through their contribution to public service delivery all involved in 'doing' the state (Migdal and Schlichte 2005), in collaboration as well as in conflict with one-another. By performing state functions without necessarily belonging to the state, they are all regulated

by formal and informal rules, each submitted to their own forms of accountabilities, blurring the traditional distinctions between private/public, state/civil society, formal/informal, endogenous/exogenous, as argued by Oliver de Sardan (Olivier de Sardan, 2014). Development actors have favoured the promotion of distinct governance forms over the years. This has included a predilection for the associational mode, followed in the name of community participation or the adoption of the municipal mode of governance, with the focus on decentralisation reforms. In these approaches little attention has been given to the dynamics between the different modes of governance and their implications for the access to public services and improvements of their quality.

Including the layer of practical norms to the understanding of this multi-actor governance opens up to new ways of understanding governance processes locally, which is either ignored or condemned by the prevailing idealised approach to governance advocated by the international donor community. The lack of considerations to, and acknowledgement of, the dynamics characterizing the interfaces between service providers and users, as well as between state institutions and donors, has characterized not only the development community of practice, but also how state institutions and governance mechanisms have commonly been approached by development research. Acknowledging that the traditional dichotomies (formal/informal, exogenous/indigenous, private/public, state/civil) are fading, and thus observing configurations of mechanisms of everyday governance and practical norms, proposes important lessons for policy-making as well as for development interventions. While it is tempting to think that universal solutions for enabling better interventions, enhanced access to public services and improvement of their quality exist, this dissertation has through an empirical understanding of the complex dynamics influencing actors involved in their provision, shown that this is far from the case. Only a better understanding of the contextual processes involved will provide the outset for better interventions and public service delivery. The need for this improved understanding will become even more acute in view of the increasing pressure of climate change impacts on governments and the urban poor.

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Article 1

Flood management in urban Senegal: an actor-oriented perspective on national and transnational adaptation interventions

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Abstract

In Senegal, considerable development assistance has been allocated to addressing the problem of repeated flooding in urban areas, involving changing thematic objectives, from short-term disaster relief to wide-ranging sanitation and drainage programmes. In spite of these numerous flood management interventions, the number of flood victims in Senegal's urban centres has increased steadily since 1999. This article contributes empirically and conceptually to recent studies highlighting poor national disaster risk-management frameworks in West Africa. The focus is on the ongoing contestations and negotiations between the actors involved and the diverging interests and motives which configure their scope for action. The article finds that the configuration of flood management policies and programmes in urban Senegal points towards three key intertwined issues which have influenced the limited achievements of flood management in urban areas. These include, but are not restricted to, the political and personal appropriation of flood management-related processes, the reinforcement of the dichotomy between central government and municipalities, and a fragmented institutional framework with overlapping institutions.

KEYWORDS: Disaster risk management, climate change adaptation, actor-oriented approach, planned interventions, flood management policies, peri-urban areas, Senegal.

1. Introduction

Since 1999, seasonal floods have become prevalent to the extent that 'the rainy season' has been renamed 'the flooding season' by the residents of poor peri-urban areas on the outskirts of Dakar, Senegal. This situation is characteristic of many countries in West Africa, where entire neighbourhoods on the outskirts of cities are almost annually paralyzed by massive flooding, a situation which is due to uncontrolled urban growth, poor urban planning and inadequate storm-water drainage systems, and which is expected to be exacerbated by climate change (World Bank and GFDRR, 2011). Evidence from the region suggests a situation of ineffective national responses with respect to disaster risk management and responses to flooding (Rakhi et al., 2008). Although governmental authorities are usually expected to assume full responsibility for disasters and individual safety (Paton and Johnston, 2004), there is an emerging perception that they cannot avert all disasters or protect people from all of their consequences (Maguire and Hagan, 2007), especially in developing countries, where numerous actors are involved in disaster risk management. Disaster risk management is part of Senegal's Poverty Reduction Strategy, and the country is a signatory to the Hyogo Framework for Action (HFA), which until recently has constituted the overarching international policy framework that has brought governments, international development agencies, experts, NGOs etc. into a common system of coordination to reduce disaster risks and increase resilience to hazards. It was replaced in March 2015 by the Sendai Framework for Disaster Risk Reduction (2015-2030). In contrast to many other West African countries, flood mitigation and adaptation initiatives in Senegal have multiplied over the last fifteen years, being led by the government with support from bilateral and multilateral donor agencies and NGOs. However, in spite of considerable donor and government funding allocated to addressing

the problem of seasonal flooding in urban areas, few sustainable solutions have been proposed thus far. Instead, the number of flood victims in Senegal's urban centres increased steadily from 170,000 in 1999 to 900,000 in 2009 (Senegal, 2010). The presence of many donors and international aid agencies and the abundance of funds allocated to flood responses have created complex national flood management processes attracting a wide array of competing actors and institutions. These are directly and indirectly involved in flood related interventions through a multitude of diverse projects and programmes aimed at flood risk reduction, disaster relief, recovery and long-term climate adaptation.

Due to the heavy influx of foreign aid, analysis of national disaster risk management in West Africa has mainly been driven by multilateral and bilateral aid agencies. In Senegal, numerous analyses of the causes, impacts, needs and costs of flooding have been undertaken over the last seven years by both bilateral and multilateral agencies (GFDRR et al., 2014; UNISDR, 2013; Government of Senegal and World Bank, 2013; UNESCO, 2011; World Bank and GFDRR, 2011; Government of Senegal, World Bank et al., 2010; World Bank and IAGU, 2009; UNISDR et al., 2008). A number of these reports typically identify 'gaps' in the flood management policies that are being pursued nationally, also recommending actions to remedy the current failures to address the problem of perennial flooding. However, due to their objectives of proposing new actions and interventions, they generally do not go into much detail in seeking to understand the underlying constructed and negotiated currents of influence over the configuration of flood management interventions in the country.

There is a body of academic literature addressing weak institutions and failures in disaster risk reduction (DRR) and climate change adaptation (CAA) governance in developing countries (Agrawal et al., 2008; Adger, 2000; Fatti and Patel, 2013; Lindell, 2008; Yaro et al., 2014; Kern and Alber, 2009; David Satterthwaite, 2011). There is another body of literature scrutinizing the practices behind the flood management approaches adopted in the West African region (see Bang, 2014; Thiam, 2013; Thiam, 2011, Diagne and Ndiaye, 2009), as well as some research analysing the implications of decentralisation for public service delivery in Senegal (Resnick, 2014a; Resnick, 2014b), but there has so far been no research which critically investigates the interplay between various development actors and state institutions, or which tries to understand how this interplay shapes institutions, policies and outcomes in relation to flood management.

To contribute to filling this research gap, the article investigates how floods have been managed in the last fifteen years, and why this management has not led to the results expected by the population, state institutions and the donor community.

The analytical framework is outlined in section 2, followed by the methodology adopted in section 3. A chronological empirical account of the flood management policies and interventions adopted is outlined in section 4, followed by a discussion of the unintended consequences of this configuration in section 5. A brief conclusion is provided in section 6.

2. Analytical framework

2.1 Conceptualizing flood management interventions

The approach followed in this article departs from the view of the state as a unified source of intentions, policies and coherent plans: instead the state is viewed as a set of complex social and negotiating processes among various actors and groups (Blundo and Le Meur, 2009), where donor interventions play a preponderant and overlapping role in state interventions. This perspective is based on elements from the anthropology of public spaces and the public action literature, which considers both public policy interventions and interventions by development institutions as the same object of study. These interventions are today intertwined to the extent that a separation line between external aid and 'endogenous' resources is now seen as futile (Bierschenk and de Sardan, 2014). As a result, the term 'intervention' is used here as an umbrella term encompassing projects and programmes engaged by, and involving, both government and development institutions (bilateral and multilateral aid agencies and NGOs). The article adopts a broad approach to flood management interventions in Senegal. These include programmes and projects of diverse scope (from food aid distribution in a flooded neighbourhood to the development of drainage master plans) and at different temporal scales of a flood event, ranging from hazard mitigation and preparedness (i.e. early-warning systems), via acute relief (i.e. shelter and food aid), community recovery and reconstruction (i.e. new housing and drainage systems) to long-term climate adaptation (i.e. development of sanitation systems and municipal capacity building).

2.2 Flood management interventions as arenas for struggle and negotiated processes

Since public authority is no longer considered to be solely the capacity of the state and is exercised and influenced by diverse actors, including donors, it may take many different forms, which may sometimes function in agreement and sometimes in competition or direct conflict (Lund, 2006). External aid is thereby mediated and modelled differently by these actors and the structures in which they operate (Long, 2001). Central to this line of thought is a critical view of the linear and rational thinking behind the ideal-type donor intervention, exemplified by the logical framework approach, according to which problems can be identified, followed by appropriate actions, leading in turn to predictable outcomes (Mosse, 2004). Instead, consistent with the actor-oriented perspective applied here, development interventions are regarded as being part of ongoing socially constructed and negotiated processes (Long and Ploeg, 1989), where actors exercise various forms of influence and hold diverging interests and conflicting motives (Thomas Bierschenk, 1988), and where the unintended consequences are often more important than the intended ones (Ferguson, 1994). A central element to the analytical framework applied here is therefore the assumption that the constant social and political struggles that occur between actors involved in interventions create new arenas for struggle over issues, resources, values and representations (Olivier de Sardan, 2005). In this article, arenas are therefore considered to be places of confrontation between actors over a shared issue, where they mobilise social relations and deploy diverse methods to obtain specific ends. Arenas do not thereby necessarily occur in distinctly demarcated settings, but may take place at different temporal scales and may therefore emerge between geographically distant actors, contexts and institutional structures (Long, 2001). In Senegal, the main

actors involved in policy and intervention processes are thus involved in coexisting arenas around flood management, for example, to access municipal flood response funding, to attract disaster risk management and climate adaptation resources to the country, to influence the direction of policy and to encourage popular support to political parties.

The existence of these diverse arenas suggests that interventions are instrumentalized by actors to serve diverse interests (i.e. strengthening professional positions and personal networks, satisfying donor country constituents, political power, private gain etc.) through ongoing competition for different symbolic and material resources. Interventions are thereby shaped by a variety of actors who compete over the opportunities made available, where power is used and mobilized according to their various intentionalities (Gramming, 2002). They are all in possession of diverse mandates and resources and operate within distinct structural constraints, according to particular social logics, which together define their unequal positions of influence and thereby their room for manoeuvre within the arenas in which they operate. All arenas are highly inter-connected, these inter-connections being manifested differently, according to the situation in question. This conveys the need to consider the forms of interaction between the actors involved, their respective reasoning, their hidden agendas and the practical strategies adopted (Bierschenk and Olivier de Sardan, 1997). Since as objects of enquiry arenas have spatial, social and temporal dimensions, a key challenge is to trace where they are situated, who has access to them and how they occur. This perspective allows us to gain insight into the ‘multiple realities’ that influence the different interpretations of flood management interventions, where different meanings are attributed to interventions by diverse groups of actors. Consequently, the analytical concept of the arena is found to be particularly appropriate for the purposes of this paper because it marks the understanding of the flood management intervention processes followed in Senegal as political and social in nature, with actors using the opportunities created by interventions to serve their own interests and priorities. The approach followed in this paper considers mainly actor interests at the level of larger group logics (Long, 2001), rather than at the individual level. Ultimately, the analytical concept of the arena allows us to point towards some the underlying reasons for the disappointing achievements of flood management in Senegal.

3. Methodology

The primary data collection took place in Dakar, Senegal, in November 2012 and from January to April 2013. Qualitative semi-structured interviews (113) and informal conversations were conducted at the national and municipal levels in Dakar and in the two municipalities of Pikine/Dakar, Guinaw Rail Nord and Dalifort, with representatives from ministries, national agencies and committees, semi-private and private institutions, NGOs, academia, international aid agencies, households, CBOs, municipal authorities, neighbourhood chiefs and religious leaders. Moreover, focus group discussions (7) with local actors and attendance at public meetings also produced data. The secondary data drawn on includes journal articles, grey literature (official reports and non-published reports gathered during interview sessions), an interpretative reading of the press, speeches and policy statements. At the

national level, interviews were conducted in French, while most interviews at the local level were conducted in Wolof with a translator, recorded and then transcribed into French.

4. Flood management interventions and policy in peri-urban Senegal

Although sporadic government actions to assist flooded communities have been recorded as far back as 1962, when disaster victims from the village of Koungany received donations from former President Léopold Sédar Senghor (Dakar-Matin, 1962a; Dakar-Matin, 1962b), it was only under President Abdou Diouf (1980-2000) that floods became a recurring reality (in 1989 and between 1994 and 1999) in rural as well as urban areas in Senegal. This section provides a chronological narrative of the most important interventions and policies applied within the domain of urban flood management in Senegal since 2000, starting under the first government to take power after the democratic transition, that of the Senegalese Democratic Party (Party Démocratique Sénégalais (PDS¹⁶)).

4.1 Improvisation and post-disaster relief (2000-2005)

The initial communication of the first Council of Ministers under the PDS regime (2000- 2012), under President Abdoulaye Wade, emphasized the need to find a permanent solution to flooding in underserved peri-urban areas (Sénégal, 2000). The PDS's stated commitment to addressing the problem of flooding gave hope to the populations affected (Thiam, 2013), who had thus far been left alone to deal with the challenges of living in underserved flood-prone areas. The first manifestation of the government's commitment to address the problems encountered by residents in informal settlements was through the « Politique de Restructuration et de Régularisation des quartiers spontanés (PRQS) ». This policy was aimed at regularizing land tenure and restructuring infrastructure (electrification, roads, sanitation) in Pikine.

The main intervention, termed the Pikine Irrégulier Sud (PIS) project, was implemented by the semi-private organisation, 'Fondation Droit à la Ville' (FDV), and financed through a collaboration between the Government of Senegal, German cooperation bodies (GTZ and KFW) and the European Union. As a first step to regularizing peri-urban neighbourhoods, residents were offered a fifty-year right of occupation (*droit de superficie*) to replace the prevailing customary law (*droit coutumier*) under which they had acquired their property. However, as they had to pay for the plot, many residents did not see the benefit of regularising their ownership arrangements, and the illegal occupation (*occupation irrégulière*) of the land continued. The focus on restructuring was straightforward at the time, as the need for urban restructuration programmes (*programmes de restructuration*) to develop peri-urban areas with irregular settlements, thus solving the recurring flooding problems, has pervaded the discourses of the government and donors in respect of solutions to flooding in the country for years. Restructuring programmes were perceived as a panacea for all difficulties facing flood-threatened areas by both the general population and public authorities alike. While there were disparate understandings of what

¹⁶ For the sake of clarity the French acronyms are maintained in the text. Organisations and programmes names in French and acronyms are listed in Annex 1.

'restructuring' entails, programmes often equated new roads with the rehousing of residents, while underlying issues such as sanitation and rainwater drainage were mainly approached on a small scale and in an ad-hoc manner.

Another main intervention for flood disasters was initiated at the time, the Plan National d'Organisation des Secours (Plan ORSEC), which was directly the responsibility of the government. The ORSEC plan was (and still is) implemented by the Directorate of Civil Protection (DPC), the formal national risk prevention and disaster management mechanism under the Ministry of Interior. The High Commission for Civil Protection (CPSC), created in 1999, served as the advisory body for the Minister of Interior on civil protection issues and for the coordination of sectoral activities in disaster prevention and relief. The ORSEC plan has been initiated repeatedly since then as a contingency plan aimed at minimizing disaster risks, as well as organizing and coordinating the national disaster response. However, in practice initiatives implemented under the plan are to this day still mainly restricted to limited acute relief, such as water-pumping and channel-digging by the fire brigade and the temporary evacuation of affected households to schools and/or military camps. The ORSEC plan is still under-resourced, and the means provided to fight flooding are considered derisory compared to the actual and acute needs of the population. In addition, several coordinating bodies for flood response were created, including the Commission Nationale de Gestion Prévisionnelle des Inondations (CONAGPI) in 2001 and the Cellule Nationale de Prévention et de Lutte contre les Inondations in 2003, among others (see Table 1).

The ONAS was created in 2003 upon the formation of the Ministry of Environment and Sanitation for the execution of tasks related to sanitation. These tasks were divided between ONAS and the Sanitation Directorate, which are to this day organized in the same manner. The Directorate is responsible for the formulation of policy, programmes and projects nationally, while ONAS's main responsibility is the disposal of wastewater in the regulated areas of Dakar. To a large extent this excludes peri-urban areas and rainwater evacuation. ONAS is responsible for closed channels, while open channels are the responsibility of local municipalities, in spite of the limited resources they have to ensure maintenance and cleaning (ADEPT, 2010).

As urban flooding gradually worsened between 2000 and 2005, isolated government programmes and projects were formulated with support from international and bilateral organizations, such as the Sanitation Programme for peri-urban areas (PAQPUD), the long-term Water programme (PELT) and the Millennium sanitation and drinking Water Programme (PEPAM). In addition, numerous NGOs and international organizations have emerged in flooded municipalities over the years (see Table 3 in Annex) to provide affected populations with relief assistance and other support, many only to disappear again. Interventions were in general mainly restricted to rudimentary relief and small-scale initiatives such as the provision of motor pumps, the creation of water retention basins (often of insufficient capacity and posing safety risks in their own right) to capture the surplus of water, the construction of open channels for water evacuation, the provision of simple pipe systems and channels, and the distribution of food and non-food items. Some victims received monetary compensation for their resettlement.

The general absence of programmes to promote a basic infrastructure adequate for flood management such as rainwater drainage and sanitation was characteristic of a government approach whereby a request for international aid and limited immediate relief once the floods had become a reality was the preferred strategy. While government policy and donor interventions between 2000 and 2005 may be summarized as consisting of expensive and unsustainable seasonal and relief support and minor infrastructural improvements to flooded areas, from 2005 their emphasis was on the policy of social housing.

4.2 Housing construction policy (2005-2008)

Disastrous floods changed the electoral calendar in 2005 when President Wade postponed parliamentary elections allegedly to save the 52 billion FCFA allocated to the elections and divert them to help flood-affected victims through a new policy of social housing construction¹⁷. Parliamentary elections were then planned to be coupled with the presidential elections of 2007, though ultimately they were not. Quite the opposite, the costs of the postponed elections increased substantially, and the government was accused of having taken them from the funds that had been collected and earmarked for the new policy of social housing construction (Thiam, 2013). The policy entailed the permanent relocation of households living in some of Pikine's high-risk areas. It was implemented under the 'Jaxaay Plan' and the 'One Family, One House' programme, initially under the National Agency against Floods and Slums (ANLIB), which had been taken over by the Ministry of Architectural Heritage, Housing and Construction. The objective of these interventions was to compensate the worst affected households for the loss of their houses by constructing 4000 new houses in a new location (the 'Cité Jaxaay'), as well as building retention ponds and gravity-based drainage systems.

These interventions came under heavy criticism from many camps. First, they were alleged to have been poorly conceived technically. Being a prototype of responses to irregular settlements and flooding, ironically the 'Cité Jaxaay' did not benefit from a proper sanitation system and adequate rainwater evacuation drainage, and experienced flooding itself in 2010, 2011 and 2012. Secondly, the programme was subject to accusations of fraud, and civil-society critics and current government representatives both saw it as a pretext for the former government to postpone elections and to collect significant funding, while relocating only a negligible number of affected households (*Senegal Post*, 2014). Unsurprisingly, some members of the PDS, now in opposition, see these criticisms as a political move by the present president, Macky Sall, to harm them (*Le Soleil*, 2013). In addition, the resettlement strategy turned out to be too expensive at the time of realization, as well as inadequate in view of the extent of the damage sustained and the number of victims.

¹⁷ The new policy consists of resettling people displaced from flood zones into houses which are constructed and subsidized by the state. Beneficiaries pay 15% of the value of the house over a period of fifteen years.

4.3 Decentralisation and the first post-disaster needs assessment (2008-2012)

From 2008 to 2012, policies, plans and interventions to address urban flooding were repeatedly formulated, many of them to be abandoned soon afterwards or never mentioned again. By the same token, some of the projects formulated before this period have never been carried out. For example, the 'One Family, One House' programme was initiated in 2006 but never materialized; the project in support of the National Disaster Prevention, Reduction and Management Programme was formulated in 2011, but nobody has heard anything about it since then; and a National Contingency Plan was validated in 2008, but has never been implemented. Similarly, platforms and committees established to address urban flooding have proved to have a short life-span. For example, the National Platform for the Reduction of Major Disaster Risks (PNRRMC), which shares the same role as the CPSC and was established in 2008, in line with HFA recommendations, was no longer operational in 2012.

This period is characterized by the strong unpopularity of the regime in power, partly due to their poor management of floods, the misuse of the funds allocated to the 'Plan Jaxaay' being a key issue of popular discontent. The unpopularity of the government culminated in violent demonstrations in peri-urban municipalities where floods had been recorded and a reversal for the political majority by the opposing coalition, Benno Siggil Senegaal (BSS) (united to rebuild Senegal), who won the municipal elections in March 2009. The voting percentage in Pikine was at its lowest (15%) for these elections, which is by experts (Thiam, 2013) and residents of Pikine mainly attributed to the government's poor management of floods.

In spite of the derisory human and financial resources available to municipalities in order to tackle floods this task was decentralized by Wade's government after the BSS opposition coalition came to office in the major urban agglomerations of the country. The BSS coalition's attempts to live up to the promises it had made during municipal elections turned out to be just as short-term and fragmented as the approach followed by the former power-holders, consisting mainly of water pumps, sewage pumping, and temporary channel digging.

Following the 2009 floods, a post-disaster needs assessment (PDNA), funded through the Global Facility for Disaster Reduction and Recovery (GFDRR) by the World Bank and the Government of Senegal, estimated the rehabilitation and reconstruction needs and costs in Dakar at more than 204.5 million USD.¹⁸ The report identified a number of priority measures, which included (1) preparing a master plan for storm-water management, (2) establishing a system for storm-water drainage in priority areas in Pikine and (3) preventing and mitigating disasters by developing an urban development plan (GFDRR et al., 2014). In order to implement these priority measures, a Rainwater Management and Climate Adaptation Programme in peri-urban areas of Dakar (Projet de Gestion des Eaux Pluviales et d'Adaptation au Changement Climatique (PROGEP)) was initiated by the government's Agence de

¹⁸ 40.7 million USD for rehabilitation and 163.8 million USD for reconstruction and disaster risk reduction.

Développement Municipal (ADM)¹⁹ with support from the World Bank, the Nordic Development Fund and the African Development Bank (AfDB) (République du Sénégal 2011). The aim of the programme is to integrate flood risks in urban planning, improve urban planning conditions and construct an extensive drainage system, based on the Plan Directeur de Drainage des Eaux Pluviales (PDDEP-2011), in collaboration with the APIX programme, while reinforcing the institutional capacity of the actors operating in this area.

4.4 A new regime and a ten-year flood management programme (2012)

In 2012 exceptionally high rainfall was seen across West Africa, which resulted in deadly floods in the capital of Senegal, where 26 people lost their lives. Residents took to the streets of the capital to denounce the government for failing to act on the floods. In response, the newly appointed President Macky Sall (from the Alliance Pour la République (APR) party) promised that the money reserved for the Senate would instead be allocated to a new Ten Year (2012-2022) Flood Management Programme (PDGI), in order to support flood victims. Members of Parliament voted to abolish the Senate, and the post of vice-president was eliminated by Congress, although no one had held the position since it had been created in 2009 by former President Abdoulaye Wade. It is unclear how much of the money set aside for the Senate was actually diverted to the implementation of the PDGI. The PDGI consists of an emergency phase and a ten-year programme to develop infrastructure for the evacuation of rainwater through an unprecedented drainage system; it is being implemented by the ADM in collaboration with the ONAS, with support from the World Bank. Implementation of the PDGI has been planned in detail, with costs totalling 720 billion FCFA in 2022, and it is currently being implemented. There is still a lack of clarity over the distribution of roles for implementing the diverse components of the PDGI and some insecurity as to future funding, which is mobilized annually. Moreover, the focus is mainly on rainwater evacuation, the provision of comprehensive sanitation not being included. Allocations for the 2012 floods amounted officially to 66 billion FCFA, while the total costs of the PDGI amounts to 720 billion FCFA. Allocations for flood management thus went from 2 to 66 billion FCFA between 2000 and 2012. During the 2012 floods, in addition to new external aid (from France, UEMOA, ECOWAS, World Bank etc.), the largest amount of televised fundraising and largest private donations to date were registered, but unfortunately the allocation of the funds collected created controversy, as they were first earmarked for the Ministry of Interior in charge of the DPC, which is responsible for the implementation of the ORSEC Plan, and were later allocated to the Ministry of Finance. Whether the funds have been used for the planned purposes is still an issue of public dispute (Fall and Diedhiou, 2013). As is the case for most disbursements and the spending of public emergency funds, procedures are complex and lengthy and lack transparency (GFDRR et al., 2014).

¹⁹ The ADM was created in 2009 by the Government of Senegal in collaboration with donors in order to support decentralisation processes.

The new regime of President Macky Sall created a ministry exclusively for the management of flood zones, the Ministry of the Restructuring and Development of Flood Zones²⁰ (MRAZI), which was supposed to consolidate the national response to floods. With the stated objective being to promote sustainable flood management through effective prevention, the development of sustainable solutions and the resettlement of flood victims, the creation of the new Ministry was presented as an expression of the government's commitment to reorganizing the failed flood response and to assign floods to a specific government organ. However, the reality turned out to be disappointing. The MRAZI did not manage to define its role clearly before it was replaced in July 2014 by the Ministry of Restructuring and Reclassification of Suburbs²¹ under the authority of the Ministry of Urban Renewal, Housing and Living Environment. The new Ministry's stated attempt at achieving synergy between stakeholders scattered throughout the complex field of flood management focuses mainly on the reorganization of municipalities that are prone to flooding by means of social housing construction programmes. During the 2013 floods the President revealed a new public housing construction program ('Yakaar City'), a prolongation of the failed Plan Jaxaay. The Yakaar City programme was partly delivered during the 2014 rainy season, disregarding residents from previously flooded sites in Guédiawaye, Médina Gounass and Djeddah-Thiaroye-Kao, where flood victims have been waiting to be resettled since 2005 (under Plan Jaxaay). The role played by the Fondation Servir le Sénégal (a foundation lead by Marième Faye Sall, the wife of President Macky Sall) in the relocation of residents and the ORSEC plan has become the subject of extensive criticism because of the lack of transparent funding allocations and the alleged influence of party politics in its activities.

5. Discussion

The analysis of the configuration of flood management policies and programmes in urban Senegal depicted above points to three key intertwined issues, which have influenced the limited achievements within the domain of flood management in urban areas. These include, but are not restricted to, the political and personal appropriation of flood management-related processes, the reinforcement of the dichotomy between central government and municipalities, and a fragmented institutional framework, with overlapping and competing institutions.

5.1 Political and personal appropriation of flood management processes

The account of flood management interventions in Senegal illustrates the significance of the political appropriation of the flooding issue. This appropriation is visible through a number of momentary periods of symbolic activity in the arena of national politics. One example was the postponing of parliamentary elections and the abolition of the Senate. These symbolic acts were linked to major flood events and were claimed to be in support of the disaster-stricken population. However, rather than such acts of support, they could be seen as ways of holding on to political power in a difficult political situation and of weakening the opposition, which had a majority in the Senate. The Plan Jaxaay, which was only partly financed by the savings made from postponing the parliamentary elections, was

²⁰ Décret n° 2013-163 du 25 janvier 2013.

²¹ Décret n°2014-899 du 22 juillet 2014.

promoted in the media not only as a technical and sustainable solution to the issue of flooding, but almost as a personal gift from the President to the ruling party. The likely substantial misuse of funds and the fact that in reality they only reached a very limited percentage of those who were in need, indicate that the main purpose of the Plan Jaxaay was to make the government's commitment concretely visible prior to the elections and thereby increase its popularity. In other words, politicians were not only seeking for the most appropriate solutions to address the flooding issue, they were mainly using a symbolic disaster response in order to influence their prospects of re-election.

Another example of symbolic activity in the arena of national politics was the creation of the Ministry for Floods (as MRAZI was baptized in everyday language) by the new regime in power under President Macky Sall. Although presented as an expression of the government's dedication to solving the perennial flood issue, the creation of the new ministry was more symbolic than followed by tangible actions. The Ministry's assignment decree was limited in scope and included mainly the Social Housing Construction Programme to Prevent Slums (PCLSLB), previously under the responsibility of the Ministry of Water. MRAZI did not manage to define its role clearly or set an agenda within the field of flood management before it was closed. With its limited mandate and lack of achievements, MRAZI thus proved to be a short-lived political response to a structural and institutional problem, which nonetheless allowed the government to demonstrate a strong national commitment to resolving the floods issue, without dedicating sufficient resources to tackling the core of the problem. These examples support the findings of Bang (2014) and Thiam (2013), who reveal how government administrations in West Africa use disaster management interventions as symbolic actions to promote their positions during election campaigns.

The examples above were related to the arena of national politics, but as we shall see below, access to international donor funding constitutes an important arena for the exclusion of political rivals at various political levels. The positioning and negotiations in the arena of donor funding are complex due to poorly formalized and mainly ad hoc flood management mechanisms and coordination processes. As a result, actors from opposition parties risk being excluded from access to and control over external funds. One example of political exclusion concerns the World Bank-financed PROGEP programme, which was started prior to the presidential elections in 2012. In the PROGEP programme observers considered the Regional Development Agency (Agence Régionale de Développement (ARD)) and the Regional Council of Dakar (CRD) to be important and relevant stakeholders in the process, but nevertheless they were finally excluded from the negotiating table and piloting committee (Mane, 2011). While there might be several reasons for this, most observers see this as a matter of politics because the two excluded institutions were headed by the opposing coalition (Alliance pour les Forces du Progrès). Other examples of such party-political exclusions are found across all levels of governance (see section 5.2).

As a result of the political and personal appropriation of flood management resources and processes and the lack of achievements within the domain of flood management, suspicion, accusations and a certain fatigue and lack of concern in this area are widespread among the actors involved. The

populations affected by floods and the many actors involved in flood responses at the national and municipal levels suspect that flood management interventions are being diverted from their original purpose of supporting victims in order to fulfil diverse political and personal interests. This fosters considerable rumours about the practices attached to interventions at multiple levels and interventions are thus in deficit of legitimacy from the very outset. In addition to the poor results of flood management, suspicions regarding the political and personal appropriation of funds are fuelled by the inoperative and non-formalised coordination mechanisms, the limited documentation of fund disbursements and use, and the opacity surrounding the roles of some of the actors involved. The relatively short time span of many project and programmes and the insecure mobilization of annual funds for longer term programmes such as the PDGI points in the same direction. The prevalence of accusations and suspicions undermines the creation of minimal relations of confidence and trust, which are central to the satisfactory delivery of flood-related interventions and services. According to Olivier de Sardan (2009), this is a general phenomenon one can observe with respect to the delivery of public and collective services in francophone West Africa.

5.2 Reinforcement of the dichotomy between central government and municipalities

Conflicts over the attribution of responsibility for flooding, for addressing impacts and for channelling support have long prevailed between national government and decentralised municipalities. This conflict was exacerbated in 2009, when the Benno Siggil Senegal (BSS) opposition coalition was elected to govern the major cities of the country over former President Abdoulaye Wade's party. This had an impact on flood management because these cities had experienced recurrent flooding and because municipalities run by the opposition party were penalized by being allocated derisory financial, physical and human resources to fight floods. In a number of cases, the most serious aspect was the decision to devolve responsibility for flood management from national government to local municipalities, without the allocation of new general funding. The governmental resources earmarked for municipalities through the Fonds d'équipement des collectivités locales and the Fonds de dotation de la décentralisation was already minimal and inadequate for most municipalities, and not sufficient for the new flood management obligations. Observers therefore saw this measure of decentralization as a general penalty imposed on the major cities run by the opposition.

In addition to the general penalization of opposition-run municipalities described above, the post-2009 period also provide examples of how specific municipalities were favoured according to their political affiliations. For example, according to expert interviews, the mayor of the municipality of Thiaroye sur Mer, who was affiliated to the Senegalese Democratic Party in power, received substantial support from the central government, while the mayor of Dalifort, who was from the opposition socialist party, was completely neglected. The party-political interference from central government in the management of municipal affairs is nothing new and has been practised by various governments. It began during the socialist era under President Senghor (1960-1980), where public drinking fountains were installed according to the political affiliations of the neighbourhood delegates ('délégués/chefs de quartier') to whom they were awarded (Salem, 1992). The same methods were observed by the former Prime

Minister, Souleymane Ndiaye Ndéné, who in 2009 visited flooded areas and allocated the sum of FCFA 10,000,000 to municipal officials from the PDS party alone.

As a result of the exclusion of the political opposition described above, municipal-level actors struggle to define and defend their own positions through individualized transformations of processes and personalized strategies. This was the case when a Pikine mayor used his personal networks in the DRR coordinating framework to tap into municipal flood response support and access support from the ORSEC plan for his municipality, or when the president of the coordination agency for community-based work in the Pikine municipality of Guinaw Rail Nord used informal channels to access information from which he was excluded regarding the flood management plans for his area. These alternative appropriations of flood management processes co-exist with the formal procedures, mandates and plans laid out for flood management at multiple levels, in, for example, the High Commission for Civil Protection (CSPC) and coordinating bodies such as the National Platform for the Reduction of Disaster Risk (PNRRMC).

As described above, the negotiation of both inclusion in and exclusion from flood management processes and arenas takes place across distinct levels of governance and is fuelled by the significant aid provided to the national level, which rarely trickles down to the municipal level. These processes are part of a more general phenomenon described by Reisnick (2014) in which vertically divided authority, i.e. opposition parties entering office at the municipal level, are perceived as a threat to service delivery at the municipal level. As has been shown, the struggle for resources and influence between the state centre and peripheral municipalities over flood interventions is found to reinforce existing dichotomies between state and municipality, interventions being used as vehicles for political projects, as described also by Lund (2007) in different contexts. It is thus not always the most appropriate or competent actors who are involved in interventions, but those who have most influence over the processes in their respective arenas.

5.3 Institutional fragmentation and overlaps

The narrative in section 4 shows that numerous coordinating mechanisms, institutions and ministries have been created and restructured, seemingly without a concerted government vision, and often to comply with international policy frameworks (such as the HFA) or at the request of international development partners. Policies and plans have often been formulated in a disarticulated manner and in isolation from one another, with little horizontal integration. Accordingly, the coordination of flood management takes place separately within the respective sectors, by new institutions put in place without dissolving the old ones, and often with short lifetimes.

The shifting and unsuccessful designations of a coordinating body for flood response management listed in Table 1 demonstrates this process of putting new institutions in place without disbanding old ones. In 2001, the National Commission for the Management and Planning of Flooding (CONAGPI) was established. In 2003, the similar National Unit for the Prevention and Fight against Flooding

(CNPLI) was instituted. In 2004, a National Unit for Flood response is created, followed by the establishment of the National Committee on Flood Prevention, Supervision and Monitoring (CNPSSLI) in 2007. In 2008 the National Platform for the Reduction of Disaster Risk (PNRRMC) was set up at the request of development partners to be coordinated by the Prime Minister's office. It is supposed to be an advisory and consultative body for all stakeholders involved in disaster risk management, including flood management policies and programmes, but has hardly been operational since its creation.

Coordination Mechanism Designation	Role	Year
Directorate of Civil Protection (DPC)	Coordination of national flood response and national relief organisation Plan (Plan ORSEC)	1999
National Commission for the Management and Planning of Flooding (CONAGPI)	Implemented but not operational	2001
National Unit for the Prevention and Fight against Flooding (CNPLI) under the Ministry of Interior	Implemented but not operational	2003
National Unit for Flood Response	National response and coordination; food aid and hygiene kits	2004
National Committee on Flood Prevention, Supervision and Monitoring (CNPSSLI)	Flood prevention and preparedness	2007
National Platform for the Reduction of Disaster Risk (PNRRMC)	Coordination of disaster risk reduction activities; follows Hyogo Framework of Action (HFA) recommendations	2008
National Flood Prevention Office (ONPI)	Coordination of storm water drainage management	2012
National Flood Committee (NILC)	Coordination of the implementation of action plans resulting from the national strategy	2009

Table 1. National flood management coordination mechanisms in Senegal.

Another example of institutional overlap is the establishment of MRAZI as described in section 4. In this case an overlap between MRAZI's mandate and other ministries already involved in flood management (see Table 2 in Annex 2) merely augmented the disorder and competition among government actors.

On the other hand this situation, where institutions with different purposes intersect and even change into one another, creates different layers of influence and legitimacy, which co-exist in the same socio-political space. This generates confusion as to their roles and responsibilities, since their reciprocal interrelations and fields of competence are inadequately defined and poorly formalized. This is observable, for example, in the case of the DPC, which, in spite of its formal role, never managed to play a leadership or coordinating role with respect to flood response in Senegal. To this day the general coordination of policies, programmes and projects related to flood management has not been attributed to the DPC, or any of the other coordination mechanisms, but has been dispersed among several ministries (Ministry of Interior, Ministry of Family and Solidarity, Ministry of Habitat, Water etc.), agencies (i.e. ADM), decentralised actors (local municipalities), and private and semi-private companies (i.e. FDV, the Sanitation Office of Senegal (ONAS)), with very limited coordination among them and

scattered mandates and prerogatives. The ambiguity entailed by these practises has led to competition between disaster responses, duplicate mechanisms and the ongoing 'negotiation' over competencies and interpretations of mandates in the domain of flood management in Senegal. In the absence of clear mandates and binding documents in the domain, this also creates inertia at the highest political level.

The practice of confusing mandates and piling up institutions can be seen partly as the result of the political and personal appropriation of the flood management processes described in section 5.1, and partly as the result of numerous fragmented donor interventions. As we have seen in this case, and as has been illustrated by the seminal work of James Ferguson (Ferguson, 1994), donor interventions tend to create new structures and institutions so that they can keep control over their own resources, but also because donor interventions have the resources to create new institutions, while on the other hand alone being in a position to recommend abandoning old ones. Leading to the same result, individual and institutional actors will try to position themselves in new arenas and propose new organisational structures in their struggle for material and symbolic resources.

The piling up of institutions described here, which is found at the national level in Senegal, has also been established for flood management processes at the local level in peri-urban Senegal, where the local state is found to be negotiated and translated differently through a number of diverse formal and informal actors (Schaer and Hahonou, forthcoming). The findings presented here also resonate with a wider body of literature concerning West Africa documenting how institutions, mainly at the local level, pile up, overlap and intersect in contexts which enjoy a high level of donor support (Bierschenk et al. 2000; Nygaard, 2008).

6. Conclusion

This article has investigated how floods have been managed in urban Senegal during the last fifteen years and asked why it has not led to the results expected by the population, state institutions and the donor community. The paper has provided a narrative of the most important interventions and policies applied within the domain of urban flood management in Senegal since 2000, starting under the first regime in power after the democratic transition, that of the Parti Démocratique Sénégalais (PDS).

This was followed by an analysis of the configuration of flood management policies and programmes, which points towards three interconnected issues that have influenced the limited achievements within the domain of flood management in urban areas. First, the political and personal appropriation of flood management processes is found to be a practice creating a culture of rumours, distrust and apathy among the actors involved in flood management. Secondly, the reinforcement of the existing dichotomy between central government and decentralised municipalities, where party politics is used strategically to marginalize peripheral actors from the opposition, has reduced the resources applied to flood management. Lastly, a fragmented institutional framework with overlapping institutions, duplicate mechanisms and an ongoing 'negotiation' of competencies and interpretation of mandates has limited the impact of flood management in Senegal.

Paradoxically, because of the limited resources available for governments such as the Senegalese, development funding for disaster risk management and climate adaptation in the domain of urban flooding is found to be an important part of the solution to dealing with repeated flooding. However, as exposed in this paper, it is also a part of the problem. The 'commodity' approach to flood management engendered by substantial development funding produces and legitimises certain practises and interests, which may work against the very objectives of flood management interventions. While this has been described by several authors locally (Lewis and Mosse, 2006; Smith, 2006; Bierschenk et al., 2000; Bierschenk, 1988), relatively little work has exposed this issue nationally, a theme to which this article forms a contribution. The findings presented here convey the need for a more profound understanding of the contextual processes, interests and mechanisms behind disaster risk management and climate change interventions in general and flood management in particular, so that interventions can meet both the current and future challenges of a changing climate.

Annex 1: Acronyms

ADM	Agence de Développement Municipal
AFDB	African Development Bank
AGR	Agence Régionale de Développement
ANAMS	Agence Nationale de la Météorologie du Sénégal
ANLIB	Agence nationale de Lutte contre les Inondations et les Bidonvilles
APIX	Agence des Grands Travaux
APR	Alliance Pour la République
BNSP	Brigade Nationale des Sapeurs Pompiers
BSS	Benno Siggil Senegal (united to rebuild Senegal)
CAP	Cellule d'Appui Psychologique
CCA	Climate Change Adaptation
CNPLI	Cellule Nationale de Prévention et de Lutte contre les Inondations
CNPSSLI	Commission Nationale de la Prévention, de Supervision et de Suivi de la Lutte contre les Inondations
CONAGPI	Commission Nationale de Gestion Prévisionnelle des Inondations
CSPC	Commission Supérieure de la Protection Civile
CRD	Conseil Régional de Dakar
DPC	Direction de la Protection Civile
DRR	Disaster Risk Reduction
ECOWAS	Economic Community Of West African States
FDV	Fondation Droit à la Ville
GFDRR	Global Facility for Disaster Reduction and Recovery
HFRA	Hyogo Framework for Action
IAGU	Institut Africain de Gestion Urbaine
MRAZI	Ministère de la Restructuration et de l'aménagement des zones d'inondation
ONAS	Office National de l'Assainissement du Sénégal
ONPI	Office National de Prévention des Inondations.
ORSEC	Plan National d'Organisation des Secours
PAQPUD	Programme d'assainissement des quartiers péri urbains de Dakar
PCLSLB	Programme de construction des logements sociaux et de lutte contre les banlieues
PDDEP	Plan Directeur de Drainage des Eaux Pluviales
PDGI	Plan Décennal de Gestion des Inondations
PDNA	Post Disaster Needs Assessment
PDS	Parti Démocratique Sénégalais
PELT	Programme Eau à Long Terme
PEPAM	Programme d'eau potable et d'assainissement du millénaire Programme
PIS	Pikine Irrégulier Sud project
PNRRMC	Plateforme Nationale pour la Réduction des Risques Majeurs de Catastrophe
PRQS	Politique de Restructuration et de Régularisation des quartiers spontanés
PROGEP	Projet de Gestion des Eaux Pluviales et d'Adaptation au Changement Climatique
UEMOA	Union Economique et Monétaire Ouest Africaine
UNISDR	United Nations Office for Disaster Risk Reduction

Annex 2: Main actors involved in urban flood management in Senegal

Sector		Area of responsibility	Year of creation
Ministry of Interior	High Commission of Civil Protection (CSPC)	Coordination of Disaster Risk Reduction (DRR) activities Advise Ministry of Interior on DRR issues	1999
	Directorate of Civil Protection (DPC)	Coordination of National Relief Organisation Plan (Plan ORSEC)	1999
	National Brigade of Firefighters (BNSP)	Organisation of Emergency Relief & implementation of ORSEC plan	1964
	Directorate for National Police	Traffic, information and security management in the context of flooding	2009
Ministry of Health	Directorate of Medical Prevention (DPM)	Medical prevention, community health	2005-2009
	Directorate of Public Hygiene (DHP)	Implementation of hygiene and public health policy	1996-2004
	Cellule d'Appui Psychologique (CAP)	Psychological assistance to flood victims	2005
Ministry of Urban Development and Housing (MUH)	MUH's urban planning missions and land use control are at the heart of flood management: construction norms, use of land, urban planning and development. (Décret n° 2004-84 du 23 janvier 2004)		2006
	Plan Jaxaay Directorate	Construction of water retention basins Housing construction for flood victims	
Ministry of Economy and Finance	Municipal Development Agency (ADM)	Support decentralisation process Funds an emergency action plan for optimizing pumping of storm water drainage (2010) Implements PROGEP	2009
Ministry of Water and Sanitation	National office for sanitation (ONAS)	Implementation of construction projects, rehabilitation and maintenance of drainage systems	1996
	Sanitation department	Responsible for the Directory Plan for rain water Drainage (PDDEP)	2011
	National Agency against Floods and Slums (ANLIB)	Housing restructuring and control of new settlements	April 2006 to Mai 2006
	Directorate for Water Resource Management and Planning (DGPPE)	Studies on water resources, inventory , planning and water ressource management	2004
Ministry in Charge of Restructuring and Managing Flood Zones (MAZRI)	National Flood Prevention Office (ONPI)	Responsible for construction and social housing program to prevent slums (PCLSLB) Initiates PCDI	2012-2014
	National Flood Committee (under Ministry of housing and construction then Ministry of Water and sanitation in 2012, then MRAZI in 2013)	Coordinates the management of storm water drainage systems	

Table 2: Ministries involved in urban flood management in Senegal

Institution		Area of responsibility	Year
Semi- public, and private organisations	National Agency for Investment Promotion of large scale construction (APIX)	Large scale infrastructure construction (highway) Implements part of the rainwater drainage component of PROGEP	2007
	'Droit à la Ville' foundation (FDV)	Restructuring plans, regularisation fonciere des quartiers irréguliers	1994
	National Agency of Meteorology of Senegal (ANAMS)	Implementation of government meteorology policy	2002
	National Agency of Statistics and Demography (ANSD)	Collection of statistical data ; economic, socio-economic studies,	2005
	Société Nationale des Télécommunications du Senegal (SONATEL)	Telecommunications, involved in ORSEC plan	1996
	Cleaning and Hygiene Agency (APROSEN)	Public Cleansing Activities, collection, transport, processing / recycling and disposal of solid waste	2005
	National office for low-cost housing (ONHLM)	Social Housing for flood victims	2006-2013
	SONES & Sénégalaise des Eaux (SDE)	Water utilities	1996
	AGEROUTE	Road works utility	2010
	Cap Vert Real Estate Company (SICAP)	Housing construction and planning of development areas to support flood victims.	2007
	National Society of Electricity in Senegal (SENELEC)	Electricity access	1998
	CETUD	Urban transportation	1997
Bilateral and multilateral organisations and NGOs	World Bank	Financing of major flood management programmes, plan and assessment reports (PDNA, PROGEP, 10 year Plan)	2010-2015
	The European Commission with support from Italy, Luxembourg, France, Sweden, Germany	Humanitarian aid through various United Nations system offices	2009
	Islamic Investment Bank	Support of emergency operations by providing assistance to populations	2009
	United Nations organisations (WFP, UNICEF, UNFPA, WHO, UNDP, OCHA)	Support in achieving the MDGs and relief and recovery support to flood victims	2009-2015
	International Federation of Red Cross and Red Crescent Societies (IFRC)	Coordinate and direct relief operations during natural disasters - Responding to emergencies	1960
	Adaptation Fund	Financial support for adaptation projects and programs on climate change	2011
	Red Cross	Training of volunteers, capacity building and assessment of vulnerability and capacity.	since 1960
	Germany	support through the International Federation of Red Cross Societies and Red Crescent Societies (IFRC)	2009-2011
	UK	Building Resilience and adaptation to climate extremes and disasters (BRACED) programme	2014
	NGOs: International Federation of Red Cross and Red Crescent societies (IFRC), SOS Children Village, Christian Relief Services' (CRS) Islamic relief France, ATD Quart Monde, World vision Senegal, CARITAS, OXFAM GB, EVE, IAGU, ENDA, ACI, IUCN, GREEN Senegal, Medicos del Mundos, Plan Sénégal, Secours Islamique Francais, Terre Nouvelle Suisse, Water Aid, World Vision	Flood mitigation, relief and recovery support, capacity building, research	
	NGO Council in support of development (CONGAD)	Support actors to integrated disaster risk reduction and management in Local Development	2000

Table 3: Main organisations involved in urban flood management in Senegal

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Article 2

'The real governance of flooding response in peri-urban Senegal: co-production, inequity and active citizenship'

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The real governance of flooding response in peri-urban Senegal: co-production, inequity and active citizenship

By Caroline Schaer (UDP) and Eric Hahonou Komlavi (RUC)

Abstract

Disastrous and recurring floods have impacted West African urban centres over the last decade, accentuating already existing vulnerabilities in poor neighbourhoods. Climate change-induced changing weather patterns and more extreme weather events are only part of the explanation for this situation, as large segments of the urban population in West Africa are not offered the public services, infrastructure and protective regulations needed in order to respond to floods. However, this does not mean that the delivery of collective services linked to floods is non-existent or ungoverned. The present article shows how the organization of collective services pertaining to flood response and climate change adaptation continues to be provided through co-production among service users and providers in a poor peri-urban municipality of Pikine, Dakar. Through a non-normative and empirically grounded approach to the effects of climate change in an urban context, the authors show the Janus face of the governance of flooding: while the co-production of flood-related services excludes the most vulnerable groups from the local negotiating arena for flood-mitigation services, this can also be seen as a manifestation of “active citizenship”.

KEYWORDS: climate adaptation, urban flooding, real governance, active citizenship, decentralization, disaster risk management, Senegal.

1. Introduction

In recent years, urban flooding has become an increasingly severe and frequent problem for the poor in many West African urban centres. In diverse metropolises of the region, including Lagos, Cotonou, Accra, Abidjan and Dakar, low-income populations who typically live in undesirable flood-prone areas see their already considerable vulnerability increased for every flooding event. In the long term, climate change is expected to make matters worse for these already tried populations, due to an increase in storm frequency and intensity, and with them in the risk of floods (Douglas et al. 2008). However, climate change is far from being the sole underlying cause for the damage caused by recurrent urban floods in West Africa. The example of Pikine, on the outskirts of Dakar, serves as a microcosm of the situation in the rest of the region.²² Here, uncontrolled urban growth, obsolete sanitation networks and the lack of storm water drainage are all factors that contribute to the yearly recurrence of floods (Mbow et al., 2008). Public management of poor urban centres is shown to be particularly invisible (Mark Pelling & Wisner, 2008). As a result, large parts of the urban population are not provided with institutions, infrastructure, services and protective regulations (David Satterthwaite, 2011b).

Local municipalities are expected to have an essential role to play in disaster risk management (DRM) and planning for climate change adaptation (CCA) since key areas of public services (urban management, health and sanitation, economic development, etc.) have been transferred from central

²² The case narrative is built on fieldwork carried out in the period from November 2012 to April 2013. It consists of a number of observations, qualitative interviews (66) and focus groups sessions (4) conducted by Caroline Schaer with local actors, households, national actors and experts in Guinaw Rail Nord, Pikine.

government to local municipalities.²³ However, the devolution of responsibilities has not been followed by a tangible fiscal decentralisation. This means that local municipalities are characterised by a lack of financial and human capacity and weak coordination (Eyoh & Stren, 2007). Far from increasing local accountability, the process of democratic decentralisation has often resulted in non-decision-making for climate adaptation, as seen in relation to vulnerability to coastal storms (Adger, 2003). This is partly due to the fact that adaptation to climate change is commonly understood as a matter of creating resilience²⁴ to likely changes with, for example, better drainage systems or coastal defences. In most urban centres in West Africa, these important infrastructural investments are often considered a governmental responsibility and an unachievable target for municipal actors that are limited by derisory financial and human resources. However, urban actors in developing countries are not merely spectators of their repeatedly devastated living conditions or passive victims of climate change. They might not be able to solve a global problem at the local level, but, as we show in this paper, they take action in order to contain the damages caused by periodic flooding.

The need for a better understanding of the means to strengthen local resilience of the urban poor against environmental hazards is being increasingly acknowledged by the research community and development agencies (Few, 2003). The significance of local responses to climate change and local governance capacity as determinants of local resilience is receiving increasing attention in both the scholarly literature (Few, 2003; Adger et al., 2003; Agrawal, 2010; Dodman & Satterthwaite, 2008; Satterthwaite, 2013) and in reports on climate change (e.g. Working Group II contribution to the Fifth Assessment Report of the IPCC (IPCC 2014)). Most research on urban flooding conducted in West Africa has dealt with the impacts and causes of urban flooding (Mbow et al., 2008; Douglas et al., 2008b), the vulnerability of urban communities in flood-prone areas (Adelekan, 2011) and the disaster risk reduction measures that have been adopted in specific cities (Diagne & Ndiaye, 2009; Gaye & Diallo, 1997; Diagne, 2007). Although local vulnerability to climate events is commonly attributed to failures in governance and weak institutions (Agrawal et al., 2008; Adger, 2000; Fatti and Patel, 2013), the body of research on local governance is sparse and still in its infancy, especially in urban and peri-urban contexts (Satterthwaite et al., 2007). Peri-urban research has mainly been led by multilateral and bilateral development agencies (Mbiba & Huchzermeyer, 2002b) and by discussions of urban dynamics mainly concentrated on what constitute ‘well-governed’ cities. Based on the ideals of ‘good governance’, these recommendations remain largely normative, abstract and insufficiently theorised. They focus on what *should* be done to enhance local climate adaptation capacity and see local institutions as vehicles for risk management and adaptation. Although studies of environmental infrastructure and services (water, sanitation, drainage and garbage collection) have emphasized some of the structural and historical explanatory factors for the deficiencies in service provision in urban centres of West Africa (Gandy, 2006; Nunan & Satterthwaite, 2001), studies of the nature of governance for the provision of services related to DRM and CCA from a non-normative and empirical perspective remain scarce (see Resnick, 2014; Resnick, 2014a).

²³ Law n° 96-06 from 22 mars 1996

²⁴ Resilience in the context of climate change and cities is defined here as the capacity of a city to absorb climate change-related disturbances and shocks while retaining the same basic structure and way of functioning (Satterthwaite, 2013).

This article aims to contribute to the sparse body of empirical research on the everyday functioning of the state in a West African urban context. Based on the recognition that local governance in poor urban centres is more than just a clear-cut question of official bureaucratic authority (Pelling & Wisner, 2008) and that it involves a complex negotiation process among various actors and groups, the present article sets out to investigate the ‘real governance’ (Olivier de Sardan, 2011) of flooding response. Weak state capacity is not necessarily equivalent to non-existent or ungoverned collective services. As we argue, the ability to respond to floods is formed largely outside the realm of the state and is maintained through co-production by service providers and users. Co-production for flood services creates an environment favourable for brokers to take ownership of central processes for service delivery. As we shall see, this leads to corrupt practices and introduces a price barrier to service, which reinforces structural inequalities locally. Furthermore, a key finding is that these local measures are not just adaptation responses to climate change or deficient public service delivery by weak institutions but a manifestation of active citizenship.

The section below first presents our overall theoretical approach. In the second section, we show how public services continue to be provided in contexts of weak state capacity. The subsequent section shows that, while the co-production of flood-related services excludes the most vulnerable groups from the local negotiation arena for flood mitigation services, it also allows them to become active citizens.

2. From ‘good’ governance to ‘real’ governance of public services – a conceptualisation

Until recently, a prominent characteristic of the research on processes of state-building and public services in Africa was that it was principally conducted within the field of political science and mainly concerned with describing the particularities of the ‘African state’ (Boone 2003, Hyden 2006, Jourde 2009) with notions such as the ‘hollowing out’ of the state and the ‘balloon state’ (Hyden 2006). This state-centric approach was more focused on theories of the state than on their empirical analysis, and the state was mainly viewed as an entity rather than a set of complex social processes (Blundo & Le Meur, 2009). Although the lack of capacity of the state in Africa to offer public services and exert authority has been exposed and discussed extensively (Chabal and Daloz 1999), surprisingly little work has focused on an empirically grounded understanding of the functioning of the state (Olivier de Sardan, 2008). Little attention has been paid to the civil servants operating daily within (and in the name of) the state, and few empirical studies of administrations, state professions and public service delivery have been undertaken (Bierschenk & Olivier de Sardan, 2014). In parallel, the focus on ‘good governance’, which has subjugated donor-driven public-sector reforms on the continent, does not account for the actual functioning of the public administration, but focuses instead on what should be in place, based on Western criteria and the norms of New Public management (Olivier de Sardan, 2008; Bierschenk & Olivier de Sardan, 2014). As a result, bad governance, defined as both unrepresentative government and inefficient non-market economic systems (Farrington, 2015), has been used as the stereotypical description of the gap between the formal idea of the functioning of local political institutions and the way they operate in practice (Blundo & Le Meur, 2009). Along the same lines, nor

has the fact that most public goods in Sub-Saharan Africa are co-produced by several actors, including formal organisations and informal collaboration between individuals and groups (Joshi & Moore, 2004; Olivier de Sardan, 2011), been the object of extensive research. A normative approach to governance, which pervades most of the literature on urban governance, is not only insufficient to grasp this complexity, it is deceptive for the way state institutions actually function and are translated locally, and the ways public services are provided in contexts of poor financial means.

In the last ten years a new body of research has emerged departing from the normative use of the governance concept and the culturalist-traditionalist approach that is pervasive in much scholarly work on the functioning of public administration in Africa, where, for example, cultural determinants, kinship, ethnicity and shared values are used to describe the *modus operandi* of the functioning of the state and bureaucracy (Anders, 2002; Booth, 2011; Olivier de Sardan, 2011a; Blundo and Le Meur, 2009; Bierschenk & de Sardan, 2014). The aim of these studies is to propose a rigorous empirical approach to analyse the real functioning of the state. This body of research considers that the state is no longer the sole actor in collective service provision. In understanding statehood, it is not only state institutions and bureaucracies that are in focus, but the multitude of formal and informal actors and institutions in the field of public authority (Joel S Migdal & Schlichte, 2005). In this sense ‘multiform institutions’ of a non-state character contribute to the provision of collective services. It is what happens at the interface between service providers and users, through an empirically grounded use of the notion of governance, which is the centre of interest. According to Blundo and LeMeur (2009), the notion of governance pertains to *‘situations in which ordering is neither restricted to the state, nor located in other (traditional or local/indigenous) institutions.’* In this sense, a wide variety of institutions exercise governance, meaning that public services are governed by various combinations of statal, associative, individual, entrepreneurial and exogenous aid-driven forms, also labelled ‘real governance’ or ‘everyday governance’ by Olivier de Sardan (2008). Interestingly, such empirically grounded approaches shed light on the modes of brokerage, mediation and translation which configure the interface between service providers and users and which thereby form the production of collective services. Observing configurations of mechanisms of everyday governance makes it possible to consider transformations of traditional centres of power and the creation of new configurations of public authority where the distinctions between the state and civil society become invalid (Blundo & Le Meur, 2009).

Within this line of thinking, we endorse this exploratory approach and descriptive use of governance, with the aim of identifying spaces where public services (commonly provided by state institutions) pertaining to floods are co-produced. In order to comprehend the local context of governance, the difficulty is not only to identify the variety of actors operating locally, but also, and importantly, to depict the complexity of the ties which connect them (Baron, 2003).

3. 'L'homme poisson' (the fish man): responding to floods in an underserviced peri-urban context

Guinaw Rail Nord (GRN) is a densely populated peri-urban municipality of 35,780 inhabitants (République du Sénégal 2011) situated in Pikine, on the periphery of Dakar. The area is characterized by insecure land tenure, the close proximity of habitations to one another, poor infrastructure and rough shacks and brick houses. From the early 1950s the area experienced uncontrolled urban growth as a result of rural-urban migration and state-ordered evictions from Dakar city centre (Fall et al, 2005). Short and more intense outbursts, together with a rapid and anarchic process of urbanization, a lack of storm drainage and waste disposal systems and the rising groundwater table of the Thiaroye aquifer, are creating increased local runoff rates in the area. The result is a higher frequency, intensity and duration of floods reported over the last thirteen years (Guha-Sapir et al, 2013). Yearly floods have had dramatic consequences for the inhabitants of this municipality, where twelve of the municipality's fourteen neighbourhoods are flooded every year. During three months, places of work are made inaccessible, families are separated, people devote all their time and resources to securing their houses and belongings from the torrents of water, and houses are eventually abandoned. For several months after a disaster, the families who decide to stay in their home are forced to live with the health and security risks which occur in the aftermath of a flood. These include diarrheal disease, wound infections, vector-borne diseases such as malaria and the risks of drowning, especially for children. The inhabitants of GRN, predominantly un- or underemployed and women-headed households, see their already considerable vulnerability drastically increased for every new flood event, since their capacity to pursue income-generating activities is considerably reduced.

The government intervenes during the floods through the formal national risk prevention and disaster management system that is put in train for flood occurrences in the country, namely the 'Plan National d'Organisation des Secours' (Plan ORSEC) under the 'Direction de la protection civile' of the Ministry of Interior.²⁵ The objective of the ORSEC Plan is to minimize risks and organize and coordinate a national flood response. However, in practice activities implemented under the plan are mainly limited to some degree of acute relief, such as water-pumping and channel-digging by the fire brigade and the evacuation of affected households to schools and military camps. Although democratic decentralisation was seen as a reform that would allow greater proximity between rulers and ruled, there is a growing consensus over the inability or unwillingness of elected rulers to solve flood-related problems. As one resident of GRN voiced it: « *There are very few mayors who have their homes flooded. They do not live what we live, and as the Wolof say it is only the person who sleeps in his own bed, who knows if there are fleas or not. If they meet, they only meet amongst themselves, it is administrative, but if they could come down to the low population it would be a good thing* ' (inhabitant of quartier Manguegui, GRN, 20 January 2013). However, the municipality of GRN has initiated a local flood management committee, overseen by the mayor of GRN and presided over by MM, which coordinates the municipal flood response. MM is also a municipal councillor in GRN and a member of 'United in Hope', a political party coalition which supports the President of Senegal, Macky Sall. The flood management committee is supposedly composed of five sub-committees in charge

²⁵ (République du Sénégal, 2013).

respectively of environmental issues, health, information dissemination, water pumping, and monitoring and evaluation. Although specified in the organizational chart for the municipal flood response, these are not fully functional due to the lack of resources and to MM's personal appropriation of the activities related to the floods.

Officially, MM's function is to coordinate the sub-committees and administer the funds, food and other forms of support in order to assist the victims and minimize the impacts felt by inhabitants. However, the committee president rather works alone within the community and engages in frequent activities neither with the sub-committees nor with the neighbourhood committee or the neighbourhood chief ('chef de quartier'). This implies that he has full control of the meagre resources allocated to his committee and that his peers have little social control over his management. The members of the committee were appointed by the mayor in 2009. All are part of the 'United in Hope' coalition. This committee replaced the former committee, which comprised members of the 'SOPI coalition', previously in power under Senegal's former president, Abdoulaye Wade. In other words, the municipality has been enjoying government support during two electoral mandates. It is important to note that party politics has been found to influence public service delivery in urban areas in the country, whereas strategies of subversion are adopted by central government towards municipalities represented by the opposition (Resnick, 2014a, 2014b). As a result, it can be expected that the political affiliation of GRN to the ruling party would have benefitted the municipality and its inhabitants through the two governmental resources earmarked for municipalities, the *Fonds de dotation de la décentralisation* and the *Fonds d'équipement des collectivités locales*, which are allocated on an ad-hoc basis by a committee of government officials. However, the resources the national government has allocated to tackling flooding issues in GRN have been derisory. In addition, there is no municipal budget earmarked exclusively for flood management. Financial resources are taken out of the budget allocated for the environment, which is between FCFA 4 and 5 million yearly out of a total municipal budget of FCFA 60 million²⁶ for a population of 35,780.

Although residents acknowledge the limited room for manoeuvre of the municipality due to its inadequate resources, they are generally very dissatisfied with and suspicious –of the support provided by both the municipality and the government. Out of this expected budget, MM declares having received approximately FCFA 300,000²⁷ yearly to meet the demands of the population with minor responses. These include mainly the provision of gasoline for water pumping, the repair of defect water pumps, emptying septic tanks, and giving 'motivations' (cash) to mobilize help in order to dig temporary channels for water evacuation. Moreover, the use of backfill ('remblayage', i.e. the elevation of the floor level by filling house and yard with sand and gravel) constitutes a common activity supported by the committee, a practice which was opposed and abandoned by the former committee and discouraged by experts and government officials due to its unsustainability and its potentially negative impacts on the community as a whole. MM argues that it is necessary to adopt a realistic and pragmatic approach to the problems posed by floods. Residents are often aware of the negative implications of

²⁶ USD 113,976,

²⁷ USD 570.

the use of backfilling. As one resident voiced it, '*if we continue like this, we will soon reach the sky*'. Indeed, after a few years most residents have to abandon the ground floor of their houses and live on the first floor, since the water level is constantly increasing. Moreover, people who do not have the means to backfill have no choice but to leave their houses permanently. Nonetheless, most people apply this approach to stay safe from the floods.

As president of the flood management committee, MM is personally allocated funds to perform his tasks on an ad-hoc basis. He is a voluntary municipal agent and therefore does not receive a fixed salary. Instead he is given a share of what is allocated by the municipality for the activities under his responsibility. This informal remuneration procedure does not allow a strict control of the resources in his charge. Not surprisingly, an atmosphere of suspicion surrounds his management of this public service, as much as it pervades the management of public goods and services more generally in Senegal (Blundo and Olivier de Sardan, 2006). In addition to the scarce public resources made available to him, MM makes use of alternative ways to fulfil his role as president of the flood management committee. Despite the fact that he is a municipal actor, his actions are not seen as the result of an institutional response to flooding. Being often seen working in the floods of water, he is nicknamed 'l'homme poisson', the fish-man, by his neighbours. Indeed, MM takes his responsibilities very seriously by engaging in a number of ad-hoc activities which are managed outside what is covered by the municipal budget. In emergency situations, where there is a need for the urgent cleaning or digging of channels for water evacuation, he calls upon religious disciples of local *dabiras* (urban Mouride associations based on shared allegiances to a particular marabout or common geographical location) of the Baye Fall brotherhood (a Mouride brotherhood founded by Ibra Fall), of which he is member, to mobilize members for support. According to him it is his status and reputation as a role model in his community and as a trusted and dedicated participant of a *dabira*, which allows him to call upon their assistance. He explains that the support of other *dabiras* from outside GRN is also provided, given their vocation to come and work for God. According to him, it is his status as a role model and his strong ties with particularly the young, most of whom he has known his entire life, which permits him to draw on the youth committees and the sports and culture associations (Associations Sportives et Culturelles) of his neighbourhood in order to support activities related to channel digging, information sharing, cleaning, etc. Out of the sum received from the mayor, he explains that he gives financial incentives to young people for the work that has to be done and in order to have some influence over them.

Municipal flood response work is also occasionally supported by volunteers, private sponsors (*mécènes*) and by the umbrella organisation of all community organisations called the CCDGR (Comité de Concertation pour le Développement de Guinaw Rail). This coordinating body is led and financed entirely by local organisations, and it has donated a water pump to the municipal flood response committee. Despite this donation, the president of the CCDGR is very frustrated at the non-inclusion of their member associations in the planning and work of the municipality with respect to floods. He finds it very counter-productive that the municipality has set up a new structure to tackle flood issues without taking into account the existing coordinating body for activities and the actors who operate in the area. In his opinion, this shows that the municipality is not interested in listening to the local

associations and groups that represent the population, which are already engaged in a number of activities to prepare for floods and support victims.

MM works directly on the ground with the fire brigade assigned to the flooded areas under the Government's ORSEC plan. He is frustrated by the lack of involvement of the municipality in the planning of activities under the ORSEC plan in terms of the targeting of areas to support, and the extent and duration of the help provided. Neighbourhood committees and households are regularly forced to provide a 'motivation' (a bribe before the service or an expected reward a posteriori) for the fire brigade in order to divert assistance to their neighbourhood or to finish a job already initiated. This motivation may be in the form of cash, gasoline or the provision of meals. The fire brigade considers this extra payment to be supplementary to a salary, which they do not consider corresponds on its own to the actual workload needed in terms of time and effort. Alternatively, when governmental or municipal support fails, households have recourse to private actors such as septic-tank emptiers and sand suppliers. As the president of the flooding committee, MM is also a member of the Malick Fall GRN neighbourhood committee, which is composed of the *chef de quartier*, an imam, a youth representative, a member of a community-based organisation, a women's group representative and a Bajanou Gokh (a woman responsible for women's health issues in the community). The neighbourhood committee is supposed to represent the interests of the neighbourhood vis-à-vis the municipality. This additional membership allows MM to benefit from the support provided by NGOs (e.g. Caritas, Eve²⁸). MM considers working with NGOs to be problematic at times because of the mismatch between the extent of the damage and the resources made available. Because it is not possible to satisfy all needs, the allocation of assistance is often the object of jealousy and controversy. As a result, MM's neighbours suspect him of not taking them into account on purpose and of favouring people closer to him. Being at the midpoint of a number of networks and institutions, MM is subjected to a number of pressures, including from his family and friends. Together with the *chef de quartier* or the imam, he is occasionally involved in resolving the conflicts that arise in his work with flood responses. Although he possesses some degree of authority and legitimacy, MM is also challenged, especially by those residents who expect some help or resources from a range of institutions to which he is connected. People openly express their frustrations and their claims. The flood management committee is not widely known by the inhabitants of GRN. Those who know it often question the usefulness and transparency of its activities, together with the competence of those responsible.

4. Reinventing and negotiating the everyday state

4.1 Service delivery through bricolage and brokerage

The above narrative sheds light on several aspects of the real governance of flood-related services. This case attests to the fact that the lack of efficiency of state institutions to provide public services has not resulted in a vacuum. Instead, a wide range of actors have entered the domain of public service

²⁸ These NGOs typically provide food aid, distribute non-food items, dig temporary channels for water evacuation and hold awareness-raising sessions on health and hygiene.

provision, as is visible in the co-production of public services such as security issues, waste management, and flood prevention and relief. Although mainly non-governmental and often spontaneous, informal responses to flood risk in GRN are nonetheless relatively organized. This substantiates findings by Pelling and Wisner (2008) regarding general urban responses to disaster risks in Africa. The flood responses observed in GRN are found to be organized according to locally developed governance logics. Several kinds of actors intervene in this field, including municipal actors (the committees, the fire brigade), local associations (youth and women groups), religious actors (Muslim Brotherhood, *dahiras*), neighbourhood chiefs and even NGOs. Given the insufficient resources available, the extent to which MM is able to fulfil his position as president of the flood management committee and the tasks which follow is conditional on his capacity to mobilize people collectively. He circumvents the bottlenecks he encounters and deploys palliative forms of governance (Olivier de Sardan 2011) by prompting, for example, the *dahiras* and local youth organisations to clean the streets and help dig waterways, a task that formally falls under the responsibility of the municipality.

Paradoxically, the formal structures which are supposed to configure MM's room for manoeuvre (e.g. the ORSEC plan and the flood management sub-committees) do not come into play as envisioned. Instead of mobilizing public institutions only according to the legal texts and formal procedures, local inhabitants give 'motivations' to the fire brigade for the relief services provided under the ORSEC plan. This attests to the prevalence of the informal privatization of public services and shows how state institutions are being privatised by its own agents as much as by users (Blundo & Le Meur, 2009). The compensation paid to youth groups for community work provides another example of this informalisation and privatisation of public service provision. This 'unintended' privatization, where communities and households step in to compensate for the failure of public services, have been found to be common in poorer countries, in the spheres of essential services and basic infrastructure such as health, water, electricity, etc. (Moser et al, 1993; Batley, 1996). Despite its limited efficacy, this daily practice of 'bricolage' allows the delivery of a public service. Importantly, such services cannot be delivered without the active participation of the citizens of GRN. At the same time, this indicates that public services related to flood responses are co-produced by service providers and users. As the central role played by MM attests, personal connections are crucial to the effective delivery of the service. Flooding is an opportunity for him to show up as a broker, a patron (redistributing 'motivations' to the young) or an actor in public service provision.

MM's ability to function as a broker of flood-related services is contingent of the existence of different normative orders in his local environment. Official rules (official norms) recognized by the state are defined by municipal decrees and national laws, which stipulate that the official responsibility for disaster relief, urban management, basic service provision etc. are rarely translated in the everyday life of the population. As a result, different local norms, which influence the actions of local actors, co-exist. According to Olivier de Sardan (2008), official norms are accompanied by social norms (morally accepted *modus operandi*) and practical norms (informal rules of the game), which altogether configure real governance. This is apparent in GRN, where the residents do not improvise in a vacuum; instead their behaviour is guided by a set of unwritten rules. An example of a practical norm is the use of

backfilling, which is not recognized by the state (official norm of not applying backfilling) and which impacts negatively on neighbouring houses (against social norm of solidarity). By accumulating sand in one place, the water is merely displaced to lower lying areas and houses. Flood-related problems are thus displaced to other houses, which is damaging for households that cannot afford to follow the same procedure and which is often a source of conflict for residents of GRN.

Whereas municipal law prohibits the practice of backfilling, most residents in the flooded areas practise it. This activity is certainly illegal (by reference to official norms) but also largely legitimate (by reference to practical norms). Interestingly, MM, who holds a position of a public authority (to some extent at least), draws his relative popular legitimacy from his deliberate breach of formal rules. His belonging to the municipality per se does not grant him automatic respect –quite the reverse, given the generally negative view of the population on socially distant municipal authorities. For a municipal representative like MM, the conflict between official norms and the demands of everyday life makes it possible to play with different sets of rules, according to the situation in question, in order to maintain his position in both the public administration and the private sphere. In this sense he can actively exploit the ambiguities resulting from the plurality of normative orders and thereby establish and reinforce his leverage as a broker in his social networks and his municipal activities. His public authority is negotiated through his connections to, and relations with, non-state actors and entities to which he has particular affiliations. At the same time, his actions are often met with suspicion or indifference by people who are outside the circle of the beneficiaries. Given the personalization of the service, MM navigates across different networks (based on residence, social status or religious membership) and political communities to mobilize the support he needs to fulfil his role, as well as to nurture his networks and to make a living. His resourcefulness or ‘street-smartness’ (*débrouillardise*) enables him to appropriate the procedures and means of the municipality informally and to take ownership of some of the flood response processes.

Even though MM enjoys some level of popular legitimacy, his political influence is somewhat limited, as he is found at the margins of most institutions and does not fully control the allocation of the resources possessed by these institutions. MM’s marginality allows him to denounce the lack of priority given to his area by the government and the little inclusion of the municipality in government plans and activities. By being seen as ‘l’homme poisson’, working for the people and knowing their realities, MM is viewed by residents less as a municipal agent than as an individual who is doing what he can for himself and for the community with the limited resources available to him. Because of the multiple hats that MM wears, he is not automatically held accountable for his actions based on his official function. The accountabilities that he meets are bureaucratic (towards the municipality), representational (towards the neighbourhood committee), reputational (towards his neighbours and the Muslim Brotherhood) and financial (towards NGOs). The multi-layered accountability he experiences sometimes works in a complementary manner when claims proceed in the same direction, as seen in the example where his work with the Baye Fall Brotherhood contributes to their will to ‘work for god’, provides the residents of GRN with relief, and fills a resource gap between the service provided by the municipality and the expectations of the residents. At other times, multi-layered accountability works in

contradictory ways, when conflicting demands arise, and it becomes difficult to satisfy all demands. The existence of these negotiators, who operate through practises of intermediation and administrative brokerage for public services in the daily management of the state in Senegal, is also described by Blundo in the context of the justice, customs and tax system (Blundo, 2006). In line with Blundo, the above provides an example where the state *voluntarily averts its eyes in situations of crises for which it has no solutions, and thus contributes to the creation of permissive spaces which legitimize, de facto, irregular practises without modifying regulations* (Blundo, 2006).

4.2 Corruption and exclusion: the other side of service co-production

As we have seen, informal remuneration for public services is widespread and often the only alternative if households are not to be plunged deeper into vulnerability. At the same time, the efficiency of public service provision and the fight against corruption have become major concerns for Senegalese politicians in quest of electoral support. Yet, everyday petty corruption and related illegal or informal practices that are common characteristics of most African ‘interface bureaucracies’ have not been seriously tackled in practice. Much of the literature that addresses the issue under the umbrella concept of ‘informal payments’ seems to cautiously avoid the term ‘corruption’. Instead, scholars often employ a range of related notions such as ‘out-of-pocket’ expenditure, ‘under-the-table’ payments for services, ‘unofficial payments’, etc. to refer to users-providers of public services exchanging money (or other resources) beyond the fees officially or legally determined by the public authorities. The diversity of terms not only reflects a multiplicity of practices, but also disagreements among scholars about the definition of the phenomenon under study (Gaal et al., 2006). To us, it clearly undermines the significance of the phenomenon and minimizes its consequences.

As we have seen in this case study, users have learned the practical rules of accessing public services by providing donations. The informal payment literature describes a donation (by opposition to a fee for service) as a sum of money or other resources given by grateful users to civil servants after the service has been provided. This type of ex-post payment is generally seen as a benign form of unofficial payment. Most authors give socio-cultural explanations for such ‘voluntary’ behaviour, which is said to be related to an endemic culture of gifts (Ensor, 2004; Gaal and McKee, 2005). Such practices are presented as compatible with social norms, although contrary to official norms. Bribery in order to access a better service has become a common practice in the African public health sector. In Senegal, the corruption of bureaucrats is well known to all (Blundo, 1996). Corruption affects the highest levels of the administration as well as the lowest. As Olivier de Sardan et al. (2005) note, the frontiers between illegality and illegitimacy are blurred, as civil servants often ask users for gifts in contexts where small presents are also thought socially acceptable. The benign character of donation is often stressed, although little empirical evidence is provided to support this. What the literature on informal payments fails to acknowledge is the asymmetric relations between service providers and users. Moreover, little attention is paid to the negative impacts of these practices in terms of equity and equality.

Thus corruption in this specific sector does not seem to be a major concern in public debates in Senegal. Flooding is mainly a problem for voiceless citizens. Corruption has, as it were, become a social institution (see Olivier de Sardan, 1999; Blundo and Olivier de Sardan, 2006). It is recognized as endemic in all areas of Senegalese society. Corruption increases the price to access public services for the poor, it introduces a price barrier to service, and it reinforces structural inequalities between the citizens of the rich areas and those from poor neighbourhoods. At the same time, we argue, corruption and other methods or strategies are ways of accessing public services. Despite the asymmetric power relations, the end-users of public services are not only the victims of the system. They also participate in it and sometimes benefit from it.

In line with Titeca and de Herdt (2011), it is found that, because of the disparity between actors and the negotiated character of public service delivery, the capacity to identify and impose decisions is a result of ongoing negotiations and is not intrinsic to the state. This means that the results of this negotiation will not be uniform, but will depend on the power configurations in specific places at specific times. In GRN the most vulnerable segments of the population²⁹ have more difficult access to flood-related services, as they are normally situated outside these negotiating arenas. The negotiating process for flood relief services in GRN is not inclusive of the poorest, as is seen in the example of poor tenants who powerlessly watched the digging of a channel initiated by the local flood-management committee. The channel created important health and security risks for them by sending all the neighbourhood's sewage water and garbage in front of their doors. This is an example where a vulnerable population group is not integrated into the local negotiating arena for flood-related services and is thereby excluded from taking part in its management. Users who are not represented in the negotiating context become anonymous and almost invisible. Excluded vulnerable population groups may therefore suffer from the disproportionate and undesirable outcomes of these negotiations.

In line with Næss et al 2005, the case of GRN shows that emergency situations cement established power structures where the voices of less powerful actors are less likely to be heard. They are typically voiceless in municipal affairs, do not belong to local organizations and are not represented in neighbourhood committees. Their limited access to local networks means restricted access to flood-related services. In this sense, the provision of collective services is unavoidably linked to the issues of exclusion and inclusion in terms of access and control (J. C. Ribot & Peluso, 2003). In this respect, the multiplicity of institutions and governance layers tend to benefit *the more affluent, the better connected and the more knowledgeable* (Lund, 2006). The municipal committee for flood response in GRN is a perfect example of what Bierschenk and De Sardan (1998) characterize as *the piling-up* of diverse types of power in the local arena, where a new type of authority is created. This merely adds to the multiple layers of institutionality already in place (i.e. the CCDGR), instead of replacing them. This means that multiple legitimate practises may be found within the same negotiating context (Hallett, 2003), which makes a coherent and transparent delivery system for flood-related services impossible. Not only does the plurality of actors and institutions render flood-related services complex, opaque and sometimes

²⁹ Typically unskilled, tenants, the elderly and/or female-headed households living in the most precarious habitations, without water, electricity or a regular source of income.

directly ineffective, by belonging to almost anyone – NGOs, local organizations, municipal authorities, state and private actors – the public space for flood response ends up belonging to no one (Blundo & Le Meur, 2009). By the same token, although the official coordinating body for flood response is there, it is not structured by any mechanisms of accountability to people or users, but depends on personal priorities and established networks. As a result, multi-layered accountability fails to be inclusive of the poorer and more vulnerable segments of the population, as no one is unequivocally held accountable for fulfilling their needs.

5. Reinventing citizenship by reshaping the governance of the city

The case described above not only sheds light on the co-production of public services by a multitude of actors and the implications of such practises, it also shows new expressions of active citizenship. Whereas the inhabitants of GRN claim the right to live a decent life and benefit from mitigation services in relation to the damage caused by recurrent flooding, they do not engage in protest actions or other classical forms of ‘activist citizenship’ (Isin and Rygiel, 2007) or ‘insurgent citizenship’ (Holston, 2009). They rather reinvent what it means to be a resident of GRN (a poor municipality of post-democratic decentralisation Senegal) and a citizen of flood-prone areas by engaging actively in the production of public services. By doing so, they also redefine the tacit social contract that links the governors and the governed. They pragmatically address the bottleneck of African public service provision. In this case study, the co-existence of a variety of political communities or subjectivities (youth and women’s groups, *dahiras*, Mouride brotherhood) offers resources to enact palliative forms of governance as much as it attests to the invention of a new urban citizenship. Neither national citizenship nor the formal status of tax-payer in the municipality of GRN helps the urban poor secure their access to the right to live in a safe place, in a city that enjoys the benefit of public services and that can allocate resources to the victims of flooding. Instead, the citizens of GRN can rely on their membership in a variety of local political communities in order to access their right to the city. The complex constellation that constitutes the climate change problematic in the context of democratic decentralisation reforms appears to be the site of emergent practices of citizenship which are context-specific (Meltzer & Rojas, 2014: 260-261). The involvement of impoverished GRN citizens in the everyday provision of flood-related services is not only a testimony to the local struggles against the global effects of climate change, but a claim to a right to the city (Lefebvre, 1967; Harvey, 2008). The claims and actions of residents are grounded in their attachment and belonging to the municipality, not to the nation state. As it were, they are inventing an urban citizenship (Holston, 2009) in which the right to make and inhabit the city is enacted in the co-production of public services. Against most forms of activist citizenship, which are generally contentious or conflictual confrontations with the public authorities, GRN citizens are claiming their rights to reside with security, safety, health and mobility by greasing municipal institutions (bribing practices to obtain a service) and by relying on their membership of a number of political associations and communities with which they collaborate to deliver flood-related services. Their action is combined with criticism of the municipality’s lack of consideration for those who live with their feet in the water and the mud.

6. Conclusion

The lack of the technical and financial capacity for both national and local government institutions to find an answer to climate change-related floods is a critical issue in West African contexts (Baudouin, 2014). As we argue here, climate change not only affects the daily lives of millions of people among the most vulnerable, it impacts on the daily governance of public services, as well as the ways in which citizenship is conceived and practised in the city. What is central to the focus of this article are the transformations in the relationships between the public authorities (at both the national and municipal levels) and the residents of flood-prone urban areas. As a result of global climate change and the lack of adequate public financial means to fight the floods, the residents of poor flood-prone urban areas are reinventing the daily practice of public services by engaging actively in their provision. In contexts in which both national and local governments lack the relevant means to mitigate the effects of climate change, the involvement of a zealous municipal councillor such as MM does not appear to allow the municipality to enjoy more popular legitimacy. Participatory solutions to climate change might be a solution (Carrapatoso & Kürzinger, 2014), but they are certainly not a panacea. In our case study, it appears that, despite the small budget allocated by the municipal council to flood mitigation, the residents are well aware that they have to count on their own forces. Indeed, to a large extent, the provision of flood-related services does not rely on the efficiency of public institutions but rather on the capacity of residents to benefit from a variety of social networks, political communities (e.g. Muslim Brotherhood) and corrupt practices. Importantly, we see that the lack of legitimacy of public authorities is an important issue to be addressed by public decision-makers. Interestingly, the inability of local and national governments to deal with climate change-related floods allows urban dwellers and their rulers to invent new forms of governance. In this case, we argue that, by engaging in the provision of public services, poor residents also become active citizens. Although poor residents collaborate with public institutions, their participation must be seen as a less visible form of the contestation of political elites and the political order. Indeed, the way the poor produce flood-related services is often against the official rules. It is both civic and insurgent. Insurgency opens up new possibilities about how to be governed, by whom, how and to what extent? What will come out of these new forms of public service delivery and citizenship remains uncertain.

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Article 3

'Condemned to live with one's feet in water?'

A case study of community based strategies and urban maladaptation in flood prone Pikine/Dakar, Senegal'.

By Caroline Schaer

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**"Condemned to live with one's feet in water?
A case study of community based strategies and urban maladaptation in flood prone
Pikine/Dakar, Senegal".**

By Caroline Schaer (UDP)

Abstract

The number of poor and informal urban settlers in the world is rapidly growing, and they are increasingly vulnerable to the impacts of a changing climate. Therefore, understanding the nature and sustainability of locally adopted coping and adaptation strategies are key, yet still under-researched areas. Based on ethnographic research conducted in two poor flood-prone municipalities in Pikine/Dakar, the article identifies such coping and adaptation strategies and examines their prospects for maladaptation. The article shows that poor urban dwellers are not mere passive spectators of climate change. With the very limited resources they have at their disposal, it is found that local actors respond to perennial flooding with very diverse strategies, which have varying degrees of success and sustainability. A key finding is that local coping and adaptation strategies are mainly maladaptive, because they divert risks and impacts in time and space and have detrimental effects on the most vulnerable. Unless there is a broad assimilation of all groups in decision-making processes locally, individual and even collective coping and adaptation strategies may easily put the most vulnerable households at greater risk. The findings reveal that community based adaptation is not a panacea per se, as it may not, by itself, compensate for the lack of basic services and infrastructure that is forcing the urban poor to cope with disproportionate levels of risk. The article hence contributes to address a central question in scholarly debates on climate adaptation, vulnerability and disaster risk management: Are local coping strategies a stepping stone towards adaptation, or are they on the contrary likely to lead to maladaptation?

KEYWORDS community based adaptation/ disaster risk management / coping and adaptation strategies/ peri-urban vulnerability / flooding / Senegal

1. Introduction

For the urban poor, the impacts of extreme climatic events are aggravating already precarious living conditions and are playing the role of multipliers of existing vulnerabilities. At the same time, climate change[1] is projected not only to intensify existing risks, but also to expose new but currently hidden vulnerabilities (Moser & Satterthwaite, 2010). Over one billion urban inhabitants across the world live in overcrowded settings, in poor-quality shelters without access to water and sanitation, and often without security of tenure. This number is expected to double to two billion by 2050 (UNHABITAT, 2008). In Africa, 72 per cent of the urban population is estimated to be living 'under slum conditions'(2007b UNEP, 2007). Due to poverty and rapid and unplanned urbanization, marginalized populations often live in informal settlements in the most precarious and unhealthy environments in urban areas, such as floodplains. They are normally the most vulnerable to adverse weather conditions because of the inadequacy of basic services and infrastructure, poverty, social inequality and inadequate social security systems (Bicknell et al., 2009; Satterthwaite et al. 2007). Climate events are thus transformed into differentiated outcomes due to environmental and social inequalities (J. Ribot, 2010). In this sense the same event can have differential effects on neighbourhoods and even on households (Blaikie et al., 1994). In Dakar's poor peri-urban areas, flooding has become a routine event in the rainy season and has been reported recurrently over the last thirteen years (Guha-Sapir et al., 2014). Due to climate change, a higher frequency of heavy rainfall events in the area is likely to escalate the incidence of floods in the long term (World Bank & GFDRR, 2011). Because of low national and local government capacity and the lack of priority given to recurrent floods in peri-urban areas in Senegal, it

is in these zones largely left to the inhabitants alone to deal with the immediate and long-term effects of living with perennial flooding. For the most vulnerable households, this means literally living with one's feet in water for up to several months a year. Consequently, the adoption of both short-term coping strategies and longer term adaptation strategies by local actors are essential prerequisites for enabling households to maintain their livelihoods.

In spite of the current and anticipated vulnerability of the world's growing poor urban population, the scientific literature on climate change adaptation (CCA) and disaster risk reduction (DRM) is still predominantly concentrated on rural areas. Although the specificities of CCA and DRM in urban contexts are gaining increased attention (see Simon, 2010; Satterthwaite et al., 2007; Lwasa, 2010; Moser & Satterthwaite, 2008; Pelling, 2011; Douglas et al., 2008), the perspectives of the urban poor are still largely overlooked (Moser and Satterthwaite 2010). CCA, DRM and vulnerability in an urban developing-country context have also received far less attention from governments and international agencies (Pelling & Wisner, 2008). Urban funding strategies, for example, have been slow to develop, and indicators to assess when chronic vulnerability becomes a humanitarian crisis are ill-suited and sometimes directly inappropriate in urban settings. Mortality rates are for example often used as an indication of the magnitude of a crisis. In urban areas it may be more pertinent to look at crime rates, food prices, sanitation, health etc.

Through an urban lens, this article contributes to current research on the role of community based adaptation for increasing local resilience to climate risks (see Reid & Huq, 2007; Forsyth, 2013; Allen, 2006; Few et al., 2007; Bryan & Behrman, 2013) by examining local coping and adaptation strategies and their implications for (mal)adaptation. The need for a better understanding of local place-based adaptation and coping strategies has long been considered a paramount research issue within the area of global environmental change (Adger, 1999; Agrawal et al., 2008). Both in development theory and practise, attention is turning towards an improved understanding of variations in local capacities to cope, as an alternative to the prevailing focus on local vulnerabilities to climate stresses (Few, 2003). By addressing coping options, people are therefore viewed as active agents rather than passive victims of circumstances (Eriksen et al., 2005). Although a range of studies have examined enabling factors permitting the capacity-building of vulnerable communities to adapt to future climate change (Yohe & Tol, 2002), limited research has considered the extent to which this capacity has been built on existing coping strategies (see Berman et al., 2012; Wamsler & Brink, 2014; Wamsler, 2007; Cooper et al., 2008; Jabeen et al., 2010). It is thus not clear whether communities that use coping to decrease their vulnerability to current climate variability are developing their capacity to adapt to future climate change. The danger is that current coping strategies may lead to maladaptation and thus jeopardize sustainable development in the long term (Berman et al., 2012).

Based on qualitative data collected in two flood-prone municipalities of Pikine/Dakar, the aim of the article is to characterize local coping and adaptation strategies and to explore their susceptibility to undermine future adaptation and thus become maladaptive. Local urban flood response strategies are investigated from both CCA and DRM perspectives, since social responses to current climate variability and extreme events are typically used as proxies for understanding climate change vulnerability and adaptation (Burton et al., 2002). These may hence hold important lessons for the future (Smit et al.,

2001). The article thus contributes to the significant discussion taking place throughout the vulnerability, disaster-risk and climate-change scholarly communities on the extent to which coping strategies should be considered a step towards adaptation, or on the contrary may lead to maladaptation (Yohe & Tol, 2002; Eriksen et al., 2005; Wamsler & Brink, 2014; Berman et al., 2012). Moreover, the findings add to the paucity of empirical research conducted on local adaptation in urban centres in West Africa (see Biconne, 2014). A key finding is that in spite of their limited room for manoeuvre, the urban poor apply a wide range of individual and collective strategies, in order to minimize risks, withstand the impacts of disasters and adapt. These allow them, in a context of weak state capacity, to react to recurrent flooding. The usefulness and sustainability of community based strategies are however somewhat limited, as they are often found to be maladaptive. The paper starts by presenting the methodology and main concepts underlying the study, followed by a description of the case study areas and a characterization of the coping and adaptation strategies adopted locally. This lays the foundation for the discussion of the potentially maladaptive nature of the strategies that are followed.

2. Methodology

Detailed case studies of two flood-prone municipalities of Guinaw Rail Nord (GRN) and Dalifort in Pikine, on the outskirts of Dakar, constitute the basis for the present analysis. These case studies shed light on the coping and adaptation strategies adopted by local actors at all phases of a flood event and their prospects for (mal)adaptation. Each case studied consists of qualitative data collected in November 2012 and from January to April 2013, locally at the household and local actor levels, as well as in ministries, NGOs, international organizations and research institutions in Dakar. Moreover, reports, books and articles only accessible locally were collected. In-depth semi-structured interviews, focus-group discussions, photographs, observations and walk-through analyses constitute the main bulk of the data production methods, together with a literature review. The data produced stems from 93 interviews and 7 focus-group discussions conducted with local actors at the household and institutional levels and 18 interviews conducted with national actors. The sampling technique was based on snowball sampling and random walk sampling (Mikkelsen, 2005). The main subjects touched upon include:

- 1) the nature of the national and local DRM and adaptation contexts
- 2) the circumstances of households' migrations into the area
- 3) how local actors are affected by recurrent flooding
- 4) the type of coping and adaptation strategies followed and the background to them
- 5) local perceptions of the capacity for flood risk management and adaptation

3. Conceptualizing coping, adaptation and maladaptive strategies

The concepts of *coping* and *adaptation* in the face of climate stresses and change are central to both scholarship and practice in the fields of disaster risk management and adaptation to climate change. Although there is habitually an understanding in the literature that coping and adaptation differ in terms of timeframe and sustainability (S. Davies, 1993), the concepts are often used interchangeably. Definitions of coping and adaptation are abundant, with numerous differences in the understanding and use of the concepts between and within both the CCA and DRM discourses. This lack of clarity often leads to confusion. A clear understanding of the peculiarity of each notion is thus essential in

order to grasp a wide range of related issues, such as those involving sustainability, coping range and adaptive capacity (Lavell et al., 2012). Coping is defined here as "the ability of people, organizations and systems, using available skills and resources, to face and manage adverse conditions, emergencies or disasters"(UNISDR, 2009). Coping is viewed as an immediate response to extreme events and threats, suggesting that people can handle a certain amount of destabilization and that at some point this capacity may be surpassed (Cardona et al., 2010). The following definition of climate adaptation is adopted here: "the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities" (IPCC, 2012). This process of adjustment may thus help to limit the "coping" that is required to cope with the next disaster. Successful coping strategies may reveal the capacity of households to respond to immediate threats, but divulge nothing about how effective they will be in the long term and what they mean for future vulnerability. In the same way that the frequent use of coping strategies may exhaust the resources available for later coping needs, it also uses resources which may otherwise be available for adaptation (W N Adger, 1996). This underlines the need also to integrate a long-term adaptation perspective when addressing disasters, as well as the necessity to consider short-term coping strategies when examining adaptation.

Given the relationship between coping and adaptation underpinning the study, Brooks and Adger's (2004) definition of adaptive capacity is adopted here: "property of a system to adjust its characteristics or behaviour, in order to expand its coping range under existing climate variability, or future climate conditions". This implies that an expansion in coping range – referring to the limits of a system's ability to cope (Yohe & Tol, 2002) – may lead to increased adaptive capacity. In contrast, the inability to expand the coping range means low adaptive capacity and thus an increase in long-term vulnerability (W N Adger, 1996). By the same token, actions taken to cope with disasters and adapt to climate change that are considered successful at a certain point in time by certain groups may be considered unsuccessful at a different time and/or place by other groups. These actions are labelled "maladaptations". Maladaptation is defined here as: "business-as-usual development which, by overlooking climate change impacts, inadvertently increases exposure and/or vulnerability to climate change. Maladaptation also includes actions undertaken to adapt to climate change impacts that do not success in reducing vulnerability but increase it instead" (OECD, 2009). The concept of maladaptation encapsulates the relationship between coping and adaptation, conveying the potential trade-offs between the short- and longer-term considerations when addressing climate impacts, where short-term gains may lead to increased vulnerability in the medium and long term (Olhoff & Schaer, 2010). Along with increased vulnerability, Barnett and O'Neill (2010) propose the following distinctive ways through which maladaptation arises:

- 1) increase emissions of greenhouse gases
- 2) high opportunity costs
- 3) negative repercussions for future generations**
- 4) disproportionate and undesirable impacts on the most vulnerable**
- 5) reduce incentives to adapt**

Out of these, it is the last three pathways through which maladaptations arise that are found relevant to the discussion of the paper.

In order to conceptualize and characterize coping and adaptation, a variety of different frameworks and typologies have been developed. In the context of environmental risks to livelihoods, basic coping strategies have typically been organized into five analytical categories of response: mobility (risks addressed across space), storage (risks attended to across time), diversification (between assets), communal pooling (across households) and market exchange (Agrawal et al., 2009). From a disaster perspective, timing is also often used to differentiate between the coping actions that are needed at various phases of a disaster: preventive, impact minimizing, recovery and reactive actions (Blaikie et al., 1994). Adaptation strategies have been categorized according to when the adaptation action will be undertaken: ex-ante (or anticipatory) adaptation is conducted before the climate impact is observed, while ex-post (or reactive) adaptation interventions occur in the aftermath of a climate impact (Smit et al., 1999). Some have discerned between structural and non-structural adaptation interventions (Parker, 1999): the former relate to infrastructure engineering interventions such as barrages and river channel modifications, whereas non-structural solutions are found in initiatives aimed at reducing hazard impacts, such as early-warning systems and building regulations (Few, 2003). Different ways of classifying adaptation strategies are also dependent on the degree to which practices are linked to other aspects of the livelihoods of households and communities (Agrawal, 2010b) and on the purposefulness of strategies (autonomous versus deliberately planned adaptation) (Füssel, 2007). Strategies have been described as taking different forms, including technical, institutional, legal, educational, and behavioural measures, involving private or public actors (Füssel, 2007).

The local coping and adaptation strategies discussed in this paper are differentiated predominantly by their timing and by whether or not they are by nature strategies supporting permanent transformations. They are classified along three distinct dimensions combining elements from Blaikie et al. (1994), Smit et al. (1999) and Füssel (2007), which are considered the most relevant for the purposes of this paper. The first category used for classifying strategies is based on the nature of the *actors* involved in decision-making at the local level (households, municipality, etc.). Secondly, the coping and adaptation options chosen are differentiated according to where they are situated on the *temporal scale*, i.e. according to when they are realised, with reference to a flood. The time scale covers anticipatory, immediate, recovery (up to six months after a flood) and long-term strategies. Coping strategies are typically found in the immediate and short-term timespan, whereas local adaptation strategies are long-term strategies which may be implemented either after or in anticipation of a flood event. Looking at this scale is relevant because the manner in which each phase of a flood is tackled is central to shaping coping and adaptation capacity. And finally, the *form* of the strategies adopted locally (social, physical, etc.) are distinguished. Together these set the foundation for the discussion of the likelihood of the applied strategies turning out to be maladaptive in the long term.

4. Two flood-prone municipalities in Pikine/Dakar: Guinaw Rail Nord and Dalifort

In 2005 it was estimated that 38.1 per cent of the urban population in Senegal lived in slums. A large proportion of this population lives in Pikine, a peri-urban area with a population of almost 900,000 situated on the periphery of Dakar (UNHABITAT, 2008a). Guinaw Rail Nord (GRN) and Dalifort are among Pikine's sixteen municipalities, with a population of respectively 35780 and 23800 (République du Sénégal 2011). GRN and Dalifort developed from the early 1950s out of uncontrolled urban growth

as a result of rural-urban migration and state-ordered evictions from Dakar city centre (Fall et al., 2005). Being considered neither as urban or rural areas and developed on the Niayes depressions without any urban planning, the neighbourhoods of Pikine are the most densely populated areas of the country, with a surface occupation of 43 per cent (UNHABITAT, 2008a). The zones are characterized by the closeness of habitations, primitive shacks and brick houses built alongside more modern habitations. Critical infrastructure and state services such as waste management, sanitation, water, etc. are at best unsatisfactory and at worst non-existent (Diouf, 2009). Peri-urban populations in these settlements face different sources of vulnerability than their rural counterparts. Commoditization, an unhealthy environment, supplementary sources of environmental danger and the loss of supportive networks (social fragmentation) are all elements that emphasize the pertinence of an urban-specific understanding of vulnerability and risks (Moser et al., 1994).

Floods have recurred in both municipalities since 2000[2], with varying impacts and durations. The reasons for recurrent flooding are complex and mainly due to an anarchic and rapid process of urbanization, which reduced the permeability of ground surfaces and increased run-off rates (Parker, 1999), the increase in rainfall, obsolete and/or absent sanitation networks, the non-existence of rainwater drainage systems and the rising groundwater table of the Thiaroye aquifer. Interviewees predominantly attributed the recurrent problems of flooding to the closeness of habitations, the lack of drainage, additional rain during the rainy season and an act of God. Although concerns such as poor health, unemployment and insecurity were also raised when asked about the difficulties of living in these areas, the majority of interviewees in GRN and Dalifort considered recurrent flooding and insufficient flood drainage to be the most destructive and far-reaching problem in their community. Many respondents explained that they moved from rural areas during the damaging droughts of the 1970s and 1980s, where there was still an abundance of land available. In Pikine the rapid urbanization process was based on parallel land-ownership arrangements (Fall et al., 2005). Later attempts at administrative reorganization mostly made land-tenure arrangements more muddled and complex (Thiam, 2013). Common to the interviewees is that they did not know that the sites were flood-prone when they acquired their land, and for the first twenty to thirty years flooding was not an issue of concern.

5. Coping and adaptation strategies

Based on the described classification, in what follows the coping and adaptation strategies pursued by local actors in GRN and Dalifort are outlined (Table 1). Since the phases of flood response are closely interlinked, it may be equally relevant for some strategies to figure in several phases. The phase categories chosen here correspond to the answers given by the interviewees on their actions before, during and within six months of a flood occurring, as well as in the longer term.

TIMING OF STRATEGY				
	ANTICIPATORY	Flood IMMEDIATE	RECOVERY	LONG-TERM
ACTORS				
Households				
<i>Economic</i>	-savings	-use savings -stay home from work -diversification of income -move place of work	-seek credit from associations -sell assets	-rent out house
<i>Social</i>	-ad hoc organization to dig temporary channels -creation of street flood committees	-mutual neighbour help to evacuate water -place children at relatives -move out temporarily -keep children home from school -seek help from CBOs	-live in one room -hire neighbourhood security guard -move out to schools and military camps	-pool resources to invest in risk-minimizing activities -create associations to fight floods and impacts -membership of "tontines" (informal saving groups) -housing cooperatives
<i>Physical/ infrastructure</i>	-minor improvements in construction (paving etc.) -dig temporary channels -build small wall outside house -food storage in plastic bins -furniture storage	-evacuate water -put sand bags in front of house -elevate bed on bricks -move kitchen & toilet to outside yard -purification of the water -acquisition of individual pumps for each house -rudimentary pipe construction for water evacuation -build embankment with car tyres	-dispose garbage outside in streets and abandoned houses -move to upper floors -remove blockages from open water channels -empty overflown septic tanks	-build extra floor(s) -owners move out permanently; -lend/rent out house -elevate floor by filling house and yard with sand and garbage (backfilling) -elevate pavement -elevate and secure septic tanks - wait for government to act
<i>Psychological</i>	-stress, anxiety	-prayers -use of Marabout -laissez faire	-shame, isolation	-acceptance of situation/apathy
Neighbourhood chief				
<i>Social</i>	-involved in flood committees	-settlement of disputes over floods		
Community-based organisations				
<i>Economic</i>		-disbursement of tontines round	-loans	-savings
<i>Social</i>		-assist households evacuating water	-demonstrations -media exposure	
<i>Physical/ infrastructure</i>		-dig temporary channels	-garbage collection and cleaning	-risk- and impact-minimizing activities (e.g. pavement construction)
NGOs				
<i>Others</i>	-awareness raising on drainage construction	-food aid -provision of blankets, mattresses, soap, detergent	-training and information on health and hygiene	
Municipalities				
<i>Social</i>	-establishment of flood committee	-integrate		-organisation of public meetings
<i>Physical/ infrastructure</i>	-support the digging of temporary channel with material	-water pumping -provision of piping, motor pumps and fuel	-emptying septic tanks -cleaning of retention basins	

Table 1: Coping and adaptation strategies identified in Guinaw Rail Nord and Dalifort, Pikine.

5.1 Anticipatory strategies

In GRN and Dalifort, households facing flood risks follow three main types of anticipatory coping strategies. First, households take action by using physical means in order to stay safe from the water. Minor improvements are made to their houses (e.g. flooring/paving, roof repairs, etc.) in order to prevent flood water entering their home. Small walls are built in front of houses and rooms, bags of sand are piled, and plastic garbage bins are used for food storage. A few households invest in individual water pumps for water evacuation. Secondly, a few interviewees mentioned saving for flood risk-minimization activities. Working is often impossible because of difficult access to the place of work and because of the additional chores engendered by the flooding as conveyed by an interviewee: "Instead of coming to work, women are forced to stay at home, to buy sand and gravel, to look after their sick children, to sanitize their houses, all of this by their own means, and therefore they cannot take care of their work anymore". Consequently, a number of respondents explained putting money aside for the rainy season in order to compensate for the lost income during that period. The poorest households would like to "flood proof" their habitation but find it extremely difficult to make ends meet and thus impossible to plan for future floods. Lastly, households reported selling their personal belongings in order to be able to prepare for the floods. This means that in many cases the only asset households have left is their house. Engaging in anticipatory strategies at the household level is often challenging, since many have not recovered from one flood before the next one strikes. This means that the anticipation phase for flood response sometimes vanishes and creates a vicious circle of increased risks and vulnerability.

A number of activities are initiated collectively prior to a flood, including the digging of temporary channels for water evacuation, typically by volunteers and young people from the local sport associations (ASCs), and sometimes with support from the municipality. Flood-management committees are constituted on an ad-hoc basis, sometimes for one street, sometimes for an entire neighbourhood, where activities related to flooding are discussed and coordinated. Often, however, these committees are not fully functional, and when they are it is mainly prior to and during the rainy season, whereas very little is done in posterior phases. There is little collaboration between neighbourhood committees, which receive no financial support and function only on a voluntary basis. A few of the well-functioning committees save money throughout the year to be able to buy gasoline for water pumps and equipment during the floods. NGOs provide limited capacity-building support in the anticipatory phase, for example, on how to establish temporary drainage. No early warning system exists for these localities and national government-led initiatives are largely absent in this phase. At the municipal level the mayor is responsible for disaster response, an area that is characterized by a lack of funding and insufficient human resources and technical capacity.

5.2 Immediate strategies

During the floods, the coping strategies of households are often characterized by improvisation, from the continuous day and night evacuation of the water to the placing of sandbags to prevent the water from flowing in. In cases where it is not possible to prevent the infiltration of water, households follow two different strategies. The first is to continue to cohabit with the water: "We stay in this water and wait for God". This is done by, for example, elevating beds on bricks, sanitizing the flood water to avoid diseases, using old car tyres to walk on the surface of the water and keeping children in sight on

the beds, which are also used for cooking and often are the only place for the entire family to sleep. When possible the ground floor is abandoned for the upper floor, or the family typically occupy a single room that is often used for all household occupations. The second strategy is to move the children and other family members to relatives (often for several months) or to be evacuated to schools or military camps. Typically the men stay in their inundated home to protect their house and belongings from the water and from looting. In addition to household-based strategies, solidarity actions are widespread during a flooding event. In addition to mutual help and collaboration between neighbours, young people from the ASCs and other local organisations provide help in digging channels, emptying water from the houses and cleaning existing water conduits. Women's groups, including i.e. *tontines* (savings groups), assist the most affected members by providing them with their share of the savings rotation or collecting clothing and other basic necessities.

The municipality in GRN is active through the local flood-management committee created by the Mayor in order to coordinate the local flood response with regards to funding, equipment and activities with NGOs and supporting the national fire brigade with water-pumping and channel-digging. There is very little coordination between the municipal committee and the neighbourhood-level committees and local organizations. Furthermore, there is no collaboration between municipalities, nor is there an overall plan, which means that the evacuation of flood water becomes an issue of conflict between neighbouring municipalities. During the floods, a number of NGOs and international organizations (Red Cross, World Food Programme, OXFAM EVE) provide disaster relief, such as food aid, the distribution of mosquito nets, detergents and other emergency supplies.

5.3 Recovery strategies

The recovery phase is in general weak and often neglected. Households have exhausted their limited coping capacity, and NGOs tend to favour the acute relief phase, except for some training provided on matters of health and hygiene. Interviewees stated that it was impossible to take out loans to repair their houses or to re-establish decent living conditions because credit institutions ask for land titles as a loan guarantee. In some cases borrowing money from informal lenders at a very high interest rate is the only option, thus resulting in an erosion of financial capital after a flood event. Remittances from family members living abroad were also mentioned as a coping strategy in the aftermath of a flood. Although some collective tasks (e.g. street-cleaning, neighbourhood private security guards) are undertaken by local community groups, mutual help is limited during this phase. The dwellers who are evacuated to military camps or schools typically stay there for far longer than the immediate flooding period (sometimes for up to a year) because they often have nothing to return to. The most vulnerable households are often forced to cohabit with the water and live in difficult conditions long after a flood event. These are defined here as the households living in the most precarious habitations, typically in wooden or metal shacks, without water, electricity or a regular source of income. Often they are composed of tenants, elderly and/or female-headed households. Some coping strategies used during prior phases, such as the creation of channels, are not followed up during the recovery phase, which means that they are filled with stagnant water and constitute health and safety risks. Since garbage collection is absent in the aftermath of a flood, abandoned houses and streets are used for garbage disposal, which also creates substantial health risks. The maintenance of motor pumps after a flood event is sometimes neglected, which means that they become inoperative for later floods.

5.4 Long-term strategies

Over the last fifty years, the inhabitants of GRN and Dalifort have developed an ability to live in these high-risk areas. The initial adaptation strategy for many of the inhabitants of these two municipalities is to settle or build a house where it is not allowed or recommended to do so. Since then, the few adaptation strategies adopted by residents are mostly autonomous, as no adaptation plan exists for the area. They can mainly be divided into two categories: residents who stay in flood-prone areas, and residents who leave permanently. "It is like houses on stilts" stated one interviewee to describe the use of a widespread autonomous local adaptation strategy called *remblayage* (backfilling) by inhabitants. This consists of elevating the outside and inside floor with garbage, gravel and sand and is thus considered as an urban alternative to houses on stilts for house preservation. This means that many houses are filled up, which gives the impression that they are sinking in the sand, to the point where some windows are at ground level and often the ground floor becomes uninhabitable. This widespread adaptation strategy was until recent years also supported by the municipality. For households with some financial means, houses are then heightened to compensate for the lost space. According to the municipality, partly as a result of this *modus operandi*, forty percent of all houses in GRN are abandoned. A number of households have also moved by their own means, either abandoning their houses or renting them out. Tenants who typically do not have many alternatives to living in a flood-prone area then assume the responsibility for house maintenance before and after a flooding event. House owners often use this strategy to preserve their house from destruction, while waiting for hypothetical government compensation and a sustainable solution to the flooding.

There is an abundance of community-based support networks and associations in GRN and Dalifort, which seek to provide permanent support to residents. All have different functions and are being activated differently to support the community in dealing with flood events. Some are intended to surmount the long-term consequences created by living in a precarious flood-prone area, such as housing cooperatives for relocation, flood management and neighbourhood committees, and informal neighbourhood groups that pool resources for risk- and impact-minimizing activities. And several are created to support residents in dealing with their more general life circumstances, such as women's groups, youth groups, ASCs, *Groupements d'intérêts économiques* (GIE) etc., while others play an advocacy role vis-à-vis the authorities and external actors. Having outlined the diverse coping and adaptation strategies followed locally at different temporal scales, the following discusses their implications for maladaptation.

6. From coping to maladaptive strategies

The following addresses the circumstances in which coping and adaptation strategies adopted locally become maladaptive. Hence, the aim is to show when individual and collective strategies followed by private actors and the support provided by external actors (a) have negative repercussions for future generations, (b) have disproportionate and undesirable impacts on the most vulnerable and (c) reduce incentives to adapt.

6.1 Private actors

Individual autonomous strategies may work well if flooding occurs only rarely, as households have the time to recover. However, repeated and unpredictable exposure to risks can drastically reduce the ability of even those households with high adaptive capacity to cope or respond effectively to risks (Agrawal et al., 2009). This is the case in GRN and Dalifort, where individual coping strategies are often exhausted by preceding floods and it becomes increasingly difficult for households to mobilize sufficient resources to cope. This means that recovery and adaptation may never be attained. These households are thus caught in a vicious circle of increased risks and vulnerability. The extensive use of backfilling as an adaptation strategy, exemplifies the detrimental implications of individual strategies. Although allowing households to stay in their houses for longer and in a reduced form, it is a relatively costly, localized and unsustainable option. A resident of GRN gave voice to the futility of this strategy: “we don’t solve the problems, but we move them and then we create new problems. Each year we spend money buying sand, this money just disappears in the water and next year the problems are even worse, but what else can we do?”. Problems are thus only diverted in time, to the following flood event, where the process can start all over. Furthermore, by accumulating a lot of sand in one place, the water is merely displaced to lower lying areas and houses. Flood-related problems are thus merely displaced to other houses, which is damaging for households that cannot afford to follow the same procedure. This displacement in space is often a source of conflicts, which are sometimes continued long after the floods.

Long-awaited durable solutions promised by the government for the area, together with insecure tenures, has created a generalized attitude where a number of households chose not to make substantial investments in their houses and are caught in a waiting position. Some are even moving back to their flooded homes, choosing not to relocate on their own or renting out their uninhabitable houses in order to access potential future state compensation. House-owners have thus been in a waiting position for years, anticipating potential relocation and state compensation, where durable investments in construction are thus considered futile by many, reducing residents’ incentives to cope and adapt on their own, thereby engendering maladaptation. In addition to being a potential source of conflict, the individual, short-term and reactive strategies identified substantiate existing research, which finds them typical in responding to disasters in Africa, but inadequate in reducing risks (Pelling & Wisner, 2008). The study found that individual coping strategies were mainly maladaptive since they merely divert flood-related challenges in time and space, while having undesirable and detrimental outcomes for the most vulnerable households. Individual coping strategies are also found to be maladaptive by having negative repercussions for the following generations. The application of short-term solutions may result in family houses being lost and the area becoming uninhabitable, which exacerbates the perpetuation of generational cycles of poverty.

Residents also engage in a number of diverse collaborative strategies to help them cope with their everyday lives and manage flood-related risks and impacts in both the short and long term. This is visible in the existence of numerous local groups, organizations and networks of individuals, which are being activated differently in order to support the community in dealing with general life circumstances and flood events, often to the common benefit of all. However, whether collective strategies are necessarily conducive to adaptation is questionable. Sometimes maladaptation is a direct consequence

of collectively initiated strategies, as seen in the chaotic digging of temporary channels, which in worst cases created erosion and other damages. This is also the case where poor tenants in GRN had no influence on the digging of a channel in front of their house, initiated by the local flood-management committee. The channel created important health and security risks for them by sending all the neighbourhood's sewage water and garbage in front of their doors. This is an example of a locally initiated, collective coping strategy, where the most vulnerable population groups are excluded from taking part in local decision-making and thus suffer from the disproportionate and undesirable impact of these initiatives. At the local level, a prerequisite in acquiring access to decision-making is to take part in local groups and networks, which is seldom possible for the poorest in GRN and Dalifort. This example shows that, although collective strategies often provide important support for the majority, when the weakest groups are not participating in risk-minimizing activities, they may also cement existing vulnerabilities and local disparities, thus creating maladaptation.

The benefits of collective strategies undertaken prior to and during flood events are often limited to coping support, as these are often not exploited and developed further in posterior phases. Examples of this tendency include the non-refilling of temporary channels, engendering health and security risks. Furthermore, flood-management committees are not used to advocating for long-term adaptation solutions with the authorities. Consequently, the fact that most collective coping actions are undertaken before and during a flood event and seldom in later phases means that they may become ineffective or at worst maladaptive by increasing vulnerability. Moreover, the numerous community groups are often under-resourced, short-lived and very localized, operating mainly in isolation, competing with one-another for the limited resources available and with little inter-group learning or collaboration. This also limits the prospects for these groups to play a more significant role in supporting the transformation of coping capacity into adaptation capacity.

In conclusion, it was found that the urban poor apply a variety of individual and collective strategies, in order to minimize risks, withstand the impacts of disasters and/or adapt. This confirms findings from Biconne (2014), Moser et al. (2010) and Wamsler (2007) and in other contexts. Individual coping strategies are found to be mainly conducive to maladaptation by diverting problems in time and space and by having detrimental effects on the most vulnerable. In Pikine, collective strategies are mostly limited to coping support, as strategies need to be more cohesive and applied at all stages of a flood event, in order to enable adaptation. The findings add to the body of research which stresses that the ability to adapt is closely linked to the ability to act collectively and that this ability is therefore determined by how vulnerable people are treated within societal structures (Adger 2001). The research thereby confirms existing findings stating that inequalities and the lack of inclusiveness of coping and adaptation strategies influence local ability to achieve resilience and pose disaster risk management and adaptation challenges at the local level (IPCC, 2012; Wamsler & Brink, 2014). The following focuses on the role of external support for (mal)adaptation.

6.2 External support

With a few exceptions, it was found that NGOs operating in the area have mainly focused their support on the immediate relief phase. As a result of the easily monetizable nature of the food aid and gasoline provided, its substantial provision in the acute relief phase often becomes an issue of struggle for local

populations. Although considered necessary by some, these activities are often the subject of criticism by residents. Many interviewees expressed mistrust in the criteria chosen for the targeting for food aid and stated that this type of relief is used mainly for political purposes and merely creates conflict and jealousy among neighbours. The fight against flooding is often replaced by the competition over external support for households and local organizations alike. This means that, instead of using external support to pool resources to solve a collective problem, internal conflict and division are stimulated and dependency increased. Residents stated having seen countless NGOs and international organizations pass through their areas, which they describe as having become NGOs' "Experimentation Laboratory". They criticize them for conducting surveys and promising long-lasting solutions to their problems, all to no avail. As a result they feel disillusioned and demotivated to engage in dialogue with outsiders. This fatigue may have negative repercussions for people's incentives to collaborate with actors from outside their locality, as suggested during a focus group session: "they can investigate us, mention us, but we see nothing happening. This is why inviting us to this meeting does not put us at ease – we are in a hurry to leave the meeting. Usually when we were invited to a meeting the room was full, but not anymore." This example evokes the alienation felt by many residents, which engenders some level of apathy. This suggests that the incentive to engage with outsiders is reduced, while the schism between poor peri-urban residents and external actors is increased.

The municipality and local actors in GRN complained about the lack of influence they have on the kind of assistance that is made available. They disapprove of the fact that it is more often based on organizations' mandates than on the expressed needs of the local population, as one resident of GRN asserted: "They come with their food, but we don't need food. Our houses are flooded– we need to get the water out, that's all". It was found that the current approach followed by external actors engenders the risks of dependency and thereby reduces communities' incentives to adapt on their own. The present findings thus add to body of research which emphasizes the need to strengthen residents' own ability to cope, contrary to the dependency being created at present (Blaikie et al., 1994). The support provided engenders not only dependency, but also division and apathy in the communities, while playing a limited and short-term role for their coping and adaptation prospects. All in all, the findings confirm the observation of the widespread dominance of short-term over long-term considerations in decision-making as a recurrent barrier to adaptation (Dovers & Hezri, 2010). Consequently, it was found that external actors' current one-sided focus on acute flood-relief efforts is maladaptive.

7. Conclusion

The distinction between local coping- and adaptation strategies along different temporal scales and their context-specific application, offers a useful lens for understanding the implications of poor urban dwellers' coping capacity for future adaptation. The evidence from Pikine has shown that a contributory cause of maladaptation is migration, where households have settled in hazardous areas, in order to escape droughts and poverty. Their present coping and adaptation capacity is therefore partly determined by past maladaptation. Maladaptive strategies have since been reproduced at lower scales. However, by identifying and classifying the multitude of coping and adaptation strategies adopted by the inhabitants of Pikine and local actors, the article has also shown that the urban poor are not mere passive victims of climate change. The case presented exemplified that in spite of their limited room for manoeuvre, the urban poor in precarious flood-prone environments are active in applying a wide range

of individual and collective strategies, in order to minimize risks, withstand the impacts of disasters and adapt. These allow them, in a context of weak state capacity, to react to perennial flooding, although their usefulness and sustainability is somewhat limited. As a result, a number of strategies are found to be maladaptive by having (1) negative repercussions for future generations, (2) disproportionate and undesirable impacts on the most vulnerable and (3) by reducing incentives to adapt. Support activities initiated by external actors are also found to be maladaptive, by decreasing local incentives to adapt and by cementing existing local disparity. A key finding is that unless there is a broad assimilation of all groups in decision-making processes locally, individual and even collective coping and adaptation strategies divert risks in time and space and may easily put the most vulnerable households at greater risk. A better representation and inclusion of the most vulnerable households and individuals in flood-related decisions is thus essential in order to prevent existing disparities and vulnerabilities from being reinforced and thus engendering maladaptation.

The findings presented contribute to develop knowledge on community based adaptation and provide a helpful foundation to compare pro-poor approaches across different geographical contexts. The evidence presented calls attention to the importance of understanding the way urban communities are already coping with – and adapting to – climate change and variability, in order to address the present and future adaptation challenges in poor urban areas. However, the findings from Pikine have also shown that community based adaptation is not a panacea per se, as it may not, by itself, compensate for the lack of basic services and infrastructure, that are forcing the urban poor to cope with disproportionate levels of risk and thus adopt maladaptive strategies. Further research is now needed on the role of government institutions and decentralized actors, in supporting the transformation of local coping capacity into adaptation capacity, so as to avoid the pitfalls of maladaptation in poor peri-urban areas.

Notes

[1] Climate Change is defined as: *"a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings, or to persistent anthropogenic changes in the composition of the atmosphere or in land use"* (IPCC 2012).

[2] Floods reported in 2000, 2002, 2003, 2008, 2009, 2010, 2011, 2012 and 2013 (Guha-Sapir et al., 2014)

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Appendix 1: Inventory of formal interviews

Institution/occupation	Interview Code	Date	Place	Language	Transcription
National institutions					
University Cheikh Anta Diop of Dakar, Geography Department	1-INTER	2.11.12	Dakar	French	No
Insitut Fondamental d'Afrique Noire (IFAN)	2-INTER 106-INTER	2.11.12 & 10.4.13	Dakar	French	Yes
Administration de Développement Municipal	4-INTER	6.11.12 & 5.2.13	Dakar	French	Yes
Direction de l'assainissement	5-INTER	7.11.12	Dakar	French	Yes
Sapeurs Pompiers, ORSEC	108-INTER	13.4.13	Dakar	French	Lost
Direction de l'Urbanisme et de l'Habitat	8-INTER	13.11.12	Dakar	French	Yes
Direction de la planification de Ressources en eau	9-INTER	13.11.12	Dakar	French	No
Office National de l'assainissement (ONAS)	10-INTER	13.11.12	Dakar	French	Yes
Agence de Development Municipal (ADM)	30-INTER	4.2.13 11.4.13	Dakar	French	Yes
APIX	40-INTER	13.2.13	Dakar	French	No
Fondation Droit A la Ville	64-INTER	6.3.13	Dakar	French	Yes
INGE SAHEL	53-INTER	19.2.13	Dakar	French	Yes
Centre de Suivi Ecologique (CSE)	103-INTER 104-INTER	6.11.12 9.4.13	Dakar	French	No
International organizations and NGOs					
ENDA Tiers Monde	11-INTER 6-INTER	14.11.12 & 12.11.12	Dakar	French	No
OCHA	3-INTER	2.11.12	Dakar	French	No
Institut Africain de la Gestion Urbaine (IAGU)	12-INTER	14.11.12	Dakar	French	No
IRD	13-INTER	15.11.12	Dakar	French	No
OXFAM-EVE, NGO	7-INTER 55-INTER	12.11.12& 25.2.13	Pikine	French	Yes
Open Society Initiative for West Africa (OSIWA)	44-INTER	13.2.13	Dakar	French	Yes
Waranka, NGO	15-GINTER	28.1.13	GRN*	French	Yes
ADTQuart Monde, NGO	49-GINTER	18.2.13	GRN	French	Yes
Forum Civil	106-INTER	8.4.13	Dakar	French	No
Municipality					
Neighbourhood Chief	1-GINTER	19.1.13	GRN	French	Yes
Neighbourhood Chief	2-GINTER	19.1.13	GRN	Wolof	Yes
Municipal councillor, care taker	3-GINTER	21.1.13	GRN	Wolof	Yes
Unemployed	4-GINTER	21.1.13	GRN	Wolof	Yes
Volunteer trainer/Petty Trade (Owner)	5-GINTER	21.1.13	GRN	Wolof	Yes
Petty trade (Tenant)	6-GINTER	22.1.13	GRN	Wolof	Yes
Unemployed (family house)	7-GINTER	22.1.13	GRN	Wolof	Yes
Unemployed (Tenant)	8-GINTER	22.1.13	GRN	Wolof	No
Cleaning lady (Owner)	9-GINTER	23.1.13	GRN	Wolof	Yes

Adjoint au Maire	10-GINTER	23.1.13	GRN	French	Yes
Unemployed (Owner)	11-GINTER	24.1.13	GRN	Wolof	Yes
Retired	12-GINTER	24.1.13	GRN	Wolof	Yes
Unemployed	13-GINTER	25.1.13	GRN	Wolof	Yes
Former member of flood management committee	14-GINTER (2 interviews)	28.1.13	GRN	French	Yes
Community Based Organisation (CBO) Umbrella organisation (CCDGR)	16-GINTER (2 interviews)	28.1.13	GRN	French	Yes
CBO	17-GINTER	29.1.13		French	Yes
CBO	18-GINTER	29.1.13	GRN	Wolof	Yes
Marabout	19-GINTER	30.1.13	GRN	Wolof	Yes
Petty Trade	20-GINTER	30.1.13	GRN	Wolof	Yes
Tailor	21-GINTER	31.1.13	GRN	French	Yes
Mechanic	22-GINTER	31.1.13	GRN	Wolof	Yes
Cleaning lady (Owner)	23-GINTER	1.2.13	GRN	Wolof	Yes
Retired/Petty trade (Family house)	24-GINTER	1.2.13	GRN	Wolof	Yes
Unemployed (Tenant)	25-GINTER	5.2.13	GRN	Wolof	Yes
Commission environment	26-GINTER	5.2.13	GRN	French	Yes
Unemployed (Tenant)	27-GINTER	7.2.13	GRN	Wolof	Yes
Sports and culture association (ASC)	28-GINTER	7.2.13	GRN	French	Yes
CBO	29-GINTER	7.2.13		Wolof	Yes
Women's network (of all CBOs)	31-GINTER	8.2.13	GRN	French	Yes
'Mutuelle de santé'	32-GINTER	8.2.13	GRN	French	No
Sports and culture department under CCDGR	33-GINTER	8.2.13		French	Yes
Petty trade (Family House)	34-GINTER	11.2.13	GRN	Wolof	Yes
Student, (Tenant)	35-GINTER	11.2.13	GRN	French	Yes
Responsable santé et assainissement	36-GINTER	12.2.13	GRN	French	Yes
Household (Owner)	37-GINTER	12.2.13	GRN	Wolof	Yes
Petty trade (Tenant)	41-GINTER	14.2.13	GRN	Wolof	Yes
Advisor to the Mayor	42-GINTER	14.2.13	GRN	French	Yes
Municipal councillor	43-GINTER	18.2.13	GRN	Wolof	Yes
President Flooding committee	45-GINTER (2 interviews)	18.2.13	GRN	French/Wo lof	Yes
Imam	46-GINTER	18.2.13	GRN	Pulaar	Yes
Municipal councillor	47-GINTER	18.2.13	GRN	French	Yes
Groupeement d'Interet Economique (GIE)	48-GINTER	20.2.13	GRN	French	Yes
Household (Owner)	50-GINTER	20.2.13	GRN	Wolof	Yes
Service sanitaire	51-GINTER	21.2.13	GRN	French	Yes
School director	52-GINTER	21.2.13	GRN	French	Yes
Mayor	102- GINTER	8.4.13	GRN	French	Yes
CBO - Guinaw Rec	57-GINTER	26.2.13	GRN	French	Yes
Secrétaire Municipal	58-DINTER	27.2.13	Dalifort	Wolof	Yes
Service assainissement	59-DINTER	27.2.13	Dalifort	Wolof	Yes
Artist (Tenant)	60-DINTER	3.3.13	Dalifort	Wolof	Yes
CBO	61-DINTER	3.3.13	Dalifort	Wolof	Yes
Unemployed (Tenant)	62-DINTER	3.3.13	Dalifort	Wolof	Yes
Petty trade (Owner)	63-DINTER	5.3.13	Dalifort	French	Yes
Comité Local de Concertation	65-DINTER	7.3.13	Dalifort	French	Yes
Attaché du cabinet du Maire	66-DINTER	7.3.13	Dalifort	French	Yes
Unemployed (tenant)	67-DINTER	11.3.13	Dalifort	Wolof	Yes

Hairdresser (tenant)	68-DINTER	11.3.13	Dalifort	Wolof	Yes
2 Mechanics	69-DINTER	11.3.13	Dalifort	Wolof	Yes
Grouoe d'Intêret Economique (GIE)	70-DINTER	13.3.13	Dalifort	Wolof	Yes
Neighbourhood Chief	71-DINTER	13.3.13	Dalifort	Wolof	Yes
Petty trade (owner)	72-DINTER	14.3.13	Dalifort	Wolof	Yes
CBO	73-DINTER	14.3.13	Dalifort	Wolof	Yes
Municipal councillor	74-DINTER	18.3.13	Dalifort	Wolof	Yes
Factory worker	75-DINTER	18.3.13	Dalifort	Wolof	Yes
Care taker (owner)	76-DINTER	20.3.13	Dalifort	Wolof	Yes
Cooperative d'habitat	77-DINTER	20.3.13	Dalifort	French	No
Cleaning lady (tenant)	78-DINTER	25.3.13	Dalifort	Wolof	Yes
Unemployed (tenant)	79-DINTER	25.3.13	Dalifort	Wolof	Yes
CBO	80-DINTER	26.3.13	Dalifort	Wolof	Yes
Mayor	81-DINTER	26.3.13	Dalifort	French	Yes
Marabout	83-DINTER	28.3.13	Dalifort	Wolof	Yes
Imam	84-DINTER	28.3.13	Dalifort	Wolof	Yes
Retired	86-DINTER	28.3.13	Dalifort	Wolof	Yes
Municipal councillor	87-DINTER	1.4.13	Dalifort	French	Yes
Sanitation and environment service	88-DINTER	1.4.13	Dalifort	French	Yes
Neighbourhood Chief	89-DINTER	1.4.13	Dalifort	Wolof	Yes
Policeman	90-DINTER	3.4.13	Dalifort	Wolof	Yes
Petty trade (tenant)	91-DINTER	3.4.13	Dalifort	Wolof	Yes
CBO	92-DINTER	4.4.13	Dalifort	Wolof	Yes
Retired (tenant)	93-DINTER	4.4.13	Dalifort	Wolof	Yes
Teacher (tenant)	94-DINTER	4.4.13	Dalifort	Wolof	Yes
Municipal councillor	95-DINTER	5.4.13	Dalifort	Wolof	Yes
Neighbourhood Chief	96-DINTER	5.4.13	Dalifort	Wolof	Yes
Groupe d'intêret economique (GIE)	97-DINTER	5.4.13	Dalifort	Wolof	Yes
Gardener (owner)	98-DINTER	6.4.13	Dalifort	Wolof	Yes
Petty trade (tenant)	99-DINTER	6.4.13	Dalifort	Wolof	Yes
Retired	100-DINTER	12.4.13	Dalifort	Wolof	Yes
Neighbourhood Chief	101-DINTER	12.4.13	Dalifort	Wolof	Yes

*Guinaw Rail Nord (GRN)

