

Enabling private sector adaptation in developing countries and their semi-arid regions – case studies of Senegal and Kenya

**Florence Crick, Mamadou Diop, Momadou Sow,
Birame Diouf, Babacar Diouf, Joseph Muhwanga
and Muna Dajani**

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This working paper is intended to stimulate discussion within the research community and among users of research, and its content may have been submitted for publication in academic journals. It has been reviewed by at least one internal referee before publication. The research for this paper was carried out as part of the PRISE project, under the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAS), with financial support from the UK Government's Department for International Development (DfID) and the International Development Research Centre (IDRC), Canada. The views expressed in this paper are those of the authors and do not necessarily represent those of the host institutions and its funders, including DfID and IDRC or its Board of Governors.

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Florence Crick¹, Mamadou Diop², Momadou Sow², Birame Diouf³, Babacar Diouf⁴, Joseph Muhwanga⁵ and Muna Dajani⁶

¹Grantham Research Institute on Climate Change and the Environment, The London School of Economics and Political Science, London. F.D.Crick@lse.ac.uk;

²Innovation Environnement Développement (IED) Afrique, Dakar, Senegal;

³Independent consultant, Senegal;

⁴Independent consultant, Senegal;

⁵Kenya Markets Trust (KMT), Nairobi, Kenya;

⁶Department of Geography, The London School of Economics and Political Science, London.

Summary

Climate change poses increasing risks to economic growth and development efforts across the world. Semi-arid regions (SARs) are one of the hotspots that have been identified by the Intergovernmental Panel on Climate Change as being particularly exposed and vulnerable to the impacts of climate change. Indeed, the majority of SARs across the world suffer from the combination of high levels of poverty, lack of development and high climate risk. Many of these issues will be further exacerbated by climate change. In addition, climate change will have significant impacts on economic activity within SARs, as the profits, competitiveness and operations of businesses become affected and production systems are altered to deal with the changing conditions.

While a lot of climate change adaptation research in developing countries and semi-arid areas has focused on households and communities, particularly in rural environments, very little research has focused on the private sector. Yet, the private sector plays a critical role in contributing to developing countries' growth and development efforts and is increasingly recognised as a key actor that can help society successfully adapt and become more resilient to climate change. Indeed, national governments are placing increasing emphasis on private sector action on climate change adaptation. Nevertheless, there is limited research examining how to promote and facilitate private sector adaptation and in particular how governments can create an enabling environment to stimulate and incentivise domestic private sector adaptation. This is especially true for the private sector in developing countries.

In this paper we address this gap in the adaptation literature by reviewing the key factors required to provide an enabling environment for the private sector, with a focus on adaptation by small and medium enterprises (SMEs) in the SARs of Kenya and Senegal. We focus on SMEs as they form a critical part of the economy in the SARs of developing countries and are highly vulnerable to climate change. We draw insights from a much larger, yet generally separate, literature on enabling environments for private sector development. This literature disaggregates the private sector and highlights key constraints to the development and growth of African SMEs, including deficient infrastructure and evidence of an African gap in access *to* and use *of* finance by SMEs. We combine both areas of scholarship to develop an assessment framework to better understand the key elements of an enabling environment for private sector adaptation and apply it to Senegal and Kenya to reveal where improvements are required to create conditions conducive to private sector and SME adaptation. This framework reveals that both Senegal and Kenya have taken action to provide an enabling environment for private sector and SME development and to strengthen the competitiveness of the private sector. Yet, much remains to be done with regards to supporting private sector adaptation to climate change, in particular for SMEs in SARs.

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1. Introduction

Climate change poses increasing risks to economic growth and development efforts across the world. Semi-arid regions (SARs) are one of the hotspots that have been identified by the Intergovernmental Panel on Climate Change (IPCC) as being particularly exposed and vulnerable to the impacts of climate change (IPCC, 2014). Indeed, the majority of SARs across the world suffer from the combination of high levels of poverty, lack of development and high climate risk (de Souza et al, 2015; Tucker et al, 2015; Jobbins et al, 2016). The high levels of poverty and poor economic growth in semi-arid economies are seen to result from a combination of a fragile natural resource base, low institutional quality and weak regulations, low levels of trade and economic integration due to remoteness and poor access to markets, low levels of human capital, inadequate physical infrastructure, and low productivity arising from poor access to finance, uncompetitive markets and under-performing businesses (Castells-Quintana et al, 2015; Lemma et al, 2015; Jobbins et al, 2016). Many of these issues will be further exacerbated by climate change. In addition, climate change will have significant impacts on economic activity within SARs, as the profits, competitiveness and operations of businesses become affected and production systems are altered to deal with the changing conditions.

While a lot of climate change adaptation research in developing countries and SARs has focused on households and communities, particularly in rural environments, very little research has focused on the private sector. Yet, the private sector plays a critical role in contributing to developing countries' growth and development efforts. Overall, in Africa for example, the private sector generates two-thirds of the continent's investment, 75% of its economic output and 90% of its formal and informal employment (AfDB, 2013b). At a country level, in Kenya the private sector accounts for over 80% of GDP and most government revenues (HAC donor working group, 2007) and in Senegal it accounts for around 85% of GDP (AfDB, 2013a). The private sector is also critical to the economy of SARs, which is dominated by micro and small and medium enterprises and the informal sector in the sectors of agriculture, livestock and trade. Understanding how climate change will affect the private sector, and those types of enterprises in particular, is critical to understanding the social and economic impacts of climate change in these regions.

Nevertheless, despite the increasing recognition of the importance of climate change adaptation for the private sector (UN Global Compact and UNEP, 2012; UNFCCC, 2013; UNISDR, 2013; UN 2014), there has been little research examining how to promote and facilitate private sector adaptation. This is especially true for the private sector in developing countries. In particular there has been little emphasis on how governments can create an enabling environment to stimulate and incentivise domestic private sector adaptation. Yet, governments have critical roles to play in supporting private sector engagement in adaptation to climate change and in removing the barriers and constraints they face. Adapting to climate change is not simply a technical issue that can be resolved through large-scale investments in infrastructure or technology transfers, but requires enabling policies and an appropriate institutional environment for individual participants in the private sector (Bapna et al, 2009; Biagini and Miller, 2013).

The emerging literature on private sector adaptation has identified some of the broad methods through which governments can support private sector adaptation, such as the provision of information, adoption of sensible regulations and creation of appropriate economic incentives (IFC, 2010; Biagini and Miller, 2013). However, little work specifically seeks to understand the key elements that constitute an enabling environment for private sector adaptation; a knowledge gap which inhibits policy formation (Stenek et al, 2013; Trabacchi and Stadelmann, 2013; Pauw, 2015).

In addition, it is important to disaggregate the term private sector and not treat it as a homogenous entity. It covers all types of businesses that can be formal or informal and range from micro

enterprises, such as local entrepreneurs and smallholder farmers, through to multinational companies operating in a multitude of countries across the world. Not all businesses possess the same capacity to consider climate change within their operations and not all businesses will require the same type of support or facilitating environment to adapt to climate change (Lonsdale et al, 2010; Pulver and Benney, 2013). In particular, small and medium enterprises (SMEs), which form a critical part of the economy in developed and developing countries, are considered highly vulnerable to climate change. They are considered to be amongst the most affected by extreme weather events and with a low ability to deal with and respond to such events (Yoshida and Deyle, 2005; Runyan, 2006; Wedawatta et al, 2010; AXA and UNEP, 2015). The impact of climate change on SMEs will have wide-ranging social and economic consequences in developing countries, as SMEs provide most employment opportunities, contribute to economic growth and are also local players strongly integrated into their communities. SMEs have the potential to integrate women and other marginalised groups into society (AfDB, 2013b). With their role in driving local development, as well as their ability to innovate and to build community resilience, SMEs are seen as important drivers for societal adaptation (Dougherty-Choux et al, 2015). Therefore, it is critical to better understand how to provide an enabling environment to support their adaptation to climate change. Yet, to date much of the literature on private sector adaptation has tended to focus on the larger companies and those based in developed countries.

In this paper we address the gap in the adaptation literature by investigating the key factors required to provide an enabling environment for private sector adaptation, with a particular focus on SMEs in the SARs of sub-Saharan Africa (SSA). While little is known about how to provide an enabling environment for private sector adaptation, there is a more extensive literature on providing an enabling environment for private sector development in general. Yet, to date this literature has remained largely disconnected with the private sector adaptation literature. Nevertheless, we believe key insights from the private sector development literature could be used to inform research on private sector adaptation. Therefore, in our paper we provide a novel approach by combining both areas of scholarship to develop an assessment framework which captures the key factors required to provide an enabling environment for private sector adaptation. We build on and extend work by Stenek et al (2013). We apply the framework to two case study countries, Senegal and Kenya, as examples of countries with significant SARs in West and East Africa. This provides an example of the potential application and value of such a framework and how it can be used by developing country governments as well as international agencies to inform strategies to enhance private sector adaptation.

2. Providing an enabling environment for private sector and SME development in sub-Saharan Africa

2.1 Characteristics of SMEs in sub-Saharan Africa

The private sector in SSA is generally characterised by a large number of micro and small enterprises and a small number of medium and large enterprises, as very few micro or small enterprises manage to make the transition to medium-sized or large companies (UNIDO and GTZ, 2008). For example, in Kenya conservative estimates suggest that there are 2.3 million SMEs (including micro enterprises) of which only 1.03 million are registered and only 1% of these are of medium size (Intellectap, 2015). This 'missing middle' creates an important disadvantage for the region, because medium or large firms tend to create the majority of higher quality and higher wage jobs and are key sources of innovation and economic diversification (Hampel Milagrosa et al, 2015). Overall, the private sector in SSA suffers from several structural deficits including widespread and rising informality, lack of upward mobility of enterprises, weak inter-firm linkages, low levels of export competitiveness, and lack of innovation capabilities (UNIDO and GTZ, 2008). The large and formal private sector in

developing countries and SSA has also failed to harness the full economic potential of women, with the majority of female entrepreneurs confined to micro-enterprises with limited growth potential and to the informal sector (Bardasi et al, 2007; Nkakleu et al, 2013; OIT, 2016). As an illustrative example, using data from the World Bank Enterprise Survey 2002-2006 Bardasi et al (2007) found that in Senegal and Kenya less than 10% of enterprises within the manufacturing sector and with over 10 employees were owned by women.

SMEs¹ form a critical part of the economy in developing countries, particularly in SSA. Indeed, in developing countries they represent the most realistic employment opportunity for many poor people, especially in rural areas (IFC, 2004; Baccheta et al, 2009; Dalberg, 2011; Edinburgh Group, 2013; Dougherty-Choux et al, 2015). In developing countries micro and small enterprises represent around 60% of total employment and in SSA this figure rises to just under 80% (Dougherty-Choux et al, 2015). For example, in Kenya, SMEs (including micro enterprises) employ around 80% of the workforce and contribute 20% to the GDP (Intellectap, 2015). In the rural and semi-arid regions of developing countries SMEs predominantly operate in the agriculture, livestock, fisheries and tourism sectors (Dougherty-Choux et al, 2015).

A large share of SMEs in SSA are in the informal sector, which restricts their access to finance, new market opportunities and access to public sector services (Fjose et al, 2010). In Senegal, the informal sector contributes to about half of the country's GDP, 90% of jobs and one-fifth of investments (AfDB, 2010; Benjamin and Mbaye, 2012). In Kenya, the private sector is noticeably split into two parts: a formal, large business sector which is relatively healthy and productive, and a massive, informal small business sector that is poorly understood and supported, yet which employs almost nine out of ten workers (AfDB 2013c). According to Intellectap (2015), 90% of Kenyan businesses in general are unregistered and within the SME sector over half of SMEs (representing 1.27 million SMEs based on a conservative estimate of a total of 2.3 million SMEs) are part of the informal economy.

Although the informal sector is often viewed as being comprised of mainly small and unorganised producers on the fringe of the formal economy, in West Africa the situation is slightly different and instead the informal sector consists of large businesses as well as SMEs. In contrast to formal large businesses, these large businesses in the informal sector tend to be privately owned by a single owner and have a small number of permanent staff and a large number of temporary staff. Typically also characterised by informal administrative structures, large informal businesses tend to be more dynamic than the stagnant formal sector (Benjamin and Mbaye, 2012). In Senegal some of these larger informal enterprises operate with a capital exceeding millions of West African CFA franc but remain in the informal sector because of a poor business climate and environment, including high taxes, high compliance costs and burdensome business regulations (Benjamin and Mbaye, 2012). The informal sector is also dominant in the SARs of SSA particularly in the key sectors of agriculture, livestock and trade. For example, in Senegal formal enterprises are mainly concentrated in the large urban areas, with 82% of SMEs located in Dakar.

¹ Within the literature there are many different definitions of SMEs. Although the majority of definitions focus on the number of employees and/or annual turnover, they are not consistent across the literature and can vary significantly between countries (see Kushnir et al, 2010 for an illustration of the divergence between countries of SME definitions based on size). For example, in Senegal SMEs are considered to have between 1 and 250 employees (the term small includes micro enterprises with small enterprises having between 1 and 20 employees, while medium have between 21 and 250 employees), while in Kenya there seems to be no official definition of SMEs. In Kenya, the Micro and Small Enterprise Authority state that micro enterprises have between 1 and 9 employees, and small between 10 and 50 employees, but it does not provide a clear definition of medium-sized SMEs.

2.2 Characteristics of an enabling environment for private sector in sub-Saharan Africa

Providing the right enabling environment is critical for private sector growth and development. On a general level, Bowen et al (2012) identify nine features that are associated with sustainable, private sector-led growth and are present in dynamic and fast-growing economies: natural capital, infrastructure, human capital, macroeconomic stability, institutional and regulatory framework, access to markets, access to capital, competitive markets and firm performance. More specific factors identified in the development literature as key components of an enabling environment for businesses include low levels of bureaucracy, simplified business registration procedures, labour regulation reforms and property titling (OECD, 2004; Altenburg and von Drachenfels, 2006; OECD, 2007; UNIDO and GTZ, 2008). Yet, there remains strong disagreement regarding the relative importance of these different factors and how successful initiatives based on these have been in the past (OECD, 2004; Altenburg and von Drachenfels, 2006; UNIDO and GTZ, 2008; Byiers and Rosengren, 2012; Pauw, 2015).

There has been a change over time in the accepted characteristics of an enabling environment. Indeed, while earlier research on private sector development recommended regulatory reform, reduced government intervention, and focused primarily on deregulation, property rights and the good functioning of markets, more recent work has criticised these approaches for not yielding the expected results (Altenburg and von Drachenfels, 2006; von Braun and Keyzer, 2006; Arrunada, 2007; Durand-Lasserve and Selod, 2007; UNIDO and GTZ, 2008; Otto, 2009; Lyons et al, 2014). One of the main criticisms is that they have tended to over-emphasise the importance of regulatory reform to remove inappropriate rules and regulations, neglect the importance of public intervention, in particular for providing services to support the development of businesses, and to minimise the importance of the specific characteristics of enterprises and in particular the internal shortcomings of micro, small and medium enterprises (Altenburg and von Drachenfels, 2006; OECD, 2007; UNIDO and GTZ, 2008; Lyons et al, 2014; Hampel-Milagrosa et al, 2015). The importance of the regulatory business environment has been overstated in past approaches with other constraints, including low technical and entrepreneurial skills, lack of access to investment capital and lack of access to market information, key to private sector and SME growth and development (Altenburg and von Drachenfels, 2006; UNIDO and GTZ, 2008). Many of these initiatives focusing on regulatory reform also failed to target, and thus benefit, informal as well as women-owned enterprises, despite the importance of these enterprises to the economic growth and development of SSA countries.

A growing literature is developing on the barriers that SMEs in SSA face to their operation and growth (see Box 1 for a summary of the key factors influencing private sector and especially SME development). In particular, there is evidence of an African gap in the access to and use of finance by SMEs and this is seen as a major bottleneck for the emergence and growth of these enterprises in Africa (OECD, 2007; Stein et al, 2013; Beck and Cull, 2014). Using data from the World Bank's Enterprise Survey, Beck and Cull (2014) found that more than 25% of firms in Africa rate the availability and cost of finance as their most important constraint, which is nearly twice as many as firms outside Africa. They also find that finance is the most cited constraint. Beck and Cull (2014) also highlight a lower use of financial services by companies inside than outside of Africa and by smaller and younger companies. In addition, there is evidence of the 'missing middle' when it comes to accessing finance for businesses in Africa. While micro enterprises can access finance through microfinance and personal loans, these types of credit sources are more limited for the more established but still vulnerable small and medium enterprises (Fjose et al, 2010). The large enterprises, on the other hand, can access the more formal bank loans. The lack of appropriate financial instruments is also applicable to women-owned SMEs and informal SMEs, as they struggle to provide the guarantees and collateral required to access such funds (Bardasi et al, 2007).

Deficient infrastructure – power, transportation, water and telecommunications – is another key constraint to the development and growth of both formal and informal SMEs in Africa and in particular in its SARs (AfDB, 2013b; APPG, 2015; Page and Soderbom, 2015). Indeed, the quality of service tends to be low, supplies are unreliable and power outages and disruptions are frequent and unpredictable (Page and Soderbom, 2015). There is a need for substantial investments in sustainable institutional and physical infrastructure development and service delivery to SMEs in all areas, but particularly in rural and remote regions, to enable access and integration into local, national and international markets (OECD, 2004). Another key gap in the business environment in SSA for SMEs involved in agribusiness is the lack of support to increase access to technology, knowledge, finance and markets (APPG, 2015). These factors are crucial to improving the business environment of both formal and informal SMEs, particularly in SARs.

Many SMEs, particularly in SARs, also suffer from a lack of skilled labour force as well as low managerial and technical capacity and skills. Improvements solely in the regulatory environment will not be sufficient to drive SME growth and development as firm characteristics play a key role (Hampel-Milagrosa et al, 2015). Indeed, Hampel-Milagrosa et al (2015) found in their recent research that critical factors in the upgrading potential of micro and small firms to medium and large-sized enterprises included several factors beyond the overall quality of the business environment. Particularly they emphasise the importance of specific entrepreneur and enterprise characteristics, including gender, education, experience, social capital, ambition and risk-readiness of the enterprise owners. As highlighted by Bardasi et al (2007), although male- and female-owned enterprises face very similar constraints in their business environment, some constraints, including crime, corruption and access to finance affect women-owned enterprises more severely. In addition, women face significant barriers to entry into entrepreneurship, as they tend to concentrate in only a few sectors, typically those that require less capital (e.g. agriculture, processing), as well as in the informal sector (Bardasi et al, 2007). Public sector and government support, with a particular focus on infrastructure, including improved access to markets, financial services, advisory services, provision of training and research, is critical to the provision of an enabling environment that will allow SMEs in rural and semi-arid areas to develop (APPG, 2015). Yet, this government support also needs to identify ways to target and reach female-owned and informal SMEs in SARs to exploit the full economic and social potential of the SME sector in those regions.

Box 1. Summary of key factors influencing private sector and in particular SME development.

- Lack of access to finance overall as well as lack of appropriate financial instruments for enterprises of different sizes
- Deficient infrastructure with low quality of service and unreliable supplies – power, transportation, water and telecommunications
- Insufficient access to technology, knowledge and training
- Insufficient access to markets, especially beyond local markets, and market information
- Lack of business development services and support systems
- Improved business environment, including through appropriate institutional and regulatory frameworks, labour regulation reform, simplified business registration, and property titling/rights
- Enterprise characteristics: lack of skilled labour force, low managerial and technical capacity and skills
- Entrepreneur characteristics: age, gender, education, experience, social capital, motivation, risk-taking ability of enterprise owner

3. Drivers and barriers to private sector adaptation

As the participation of the private sector, and SMEs in particular, in adaptation becomes increasingly important a key question from a government's perspective is how it can be facilitated. This is important to enhance private sector and economic growth, and to do so in a manner which is climate-resilient. Understanding what might drive and motivate the private sector to adapt to climate change is critical, as it can enable policy makers to provide and support favourable conditions for, as well as remove barriers to, private sector adaptation i.e. provide an enabling environment for business adaptation. While basic motives for private sector adaptation include keeping costs down, minimising disruption to production and services, maintaining or increasing value and profitability, and improving capacity and ability to do business, there is a range of internal and external factors that influence private sector adaptation. In this section, we provide only a brief overview of these factors and focus on the factors most relevant to SMEs, as a recent and more extensive review can be found in Averchenkova et al (2016). A summary of the key factors driving private sector adaptation is provided in Box 2.

Just as firm and entrepreneur characteristics appear critical in influencing the growth, development and upgrade potential of SMEs, internal factors and capabilities within a company will influence its willingness and ability to adapt to climate change (Hertin et al, 2003; Lonsdale et al, 2010; Agrawala et al, 2011; Galbreath, 2011; UN Global Compact et al, 2011; Berkhout, 2012; Ballard et al, 2013; Linnenluecke et al 2013; PWC, 2013; Trabbachi and Mazza, 2015). For example, key decision makers, such as business owners, or internal champions have critical roles to play in identifying and communicating climate risks and opportunities and supporting adaptation decision-making. Businesses also need the right knowledge, skills and resources to adapt to climate change, and the characteristics of a business, including its size and type, will affect its ability to adapt. The lack of appropriate information and knowledge, insufficient resources, low levels of awareness of risks and inadequate expertise within a company will constrain its capacity and ability to invest in adaptation action (Lonsdale et al, 2010; PWC, 2010; Agrawala et al, 2011; Ballard et al, 2013; Crawford and Seidel, 2013). There is a key role for government in supporting adaptation through enabling these capacities. Governments could support adaptation by domestic businesses by providing credible, easily accessible scientific information, weather and climate services, guidelines, models and tools, and co-financing research and development of new products and services (Agrawala et al, 2011; UN Global Compact and UNEP, 2012; Biagini and Miller, 2013; Crawford and Seidel, 2013; OECD, 2015).

The differences in time horizons between climate change impacts and businesses' investment horizons and need for quick returns and short term growth also present key challenges to all businesses, including SMEs. Indeed, businesses of all sizes face trade-offs between actions to optimise short-term growth and actions to reduce climate risk (Surminski, 2013). In addition, the short-term investment horizons of businesses can impact their willingness to invest in longer-term adaptation measures and develop product and services to reduce climate impacts (Trabacchi and Mazza, 2015). Further, planning for long-term adaptation measures requires the ability to make long-term decisions under conditions of uncertainty, which many businesses find difficult even in their core operations (Ballard et al, 2013). SMEs in particular are seen to lack the knowledge and capacity to plan for climate change and to have limited financial capacity to cover the high upfront capital costs of investing in long-term adaptation measures (Trabbachi and Mazza, 2015). Combined with their limited access to financial products and services, as highlighted above, SMEs face specific and critical challenges to invest in adaptation (Trabacchi and Mazza, 2015).

External factors also play a critical role in influencing a firm's ability and willingness to adapt to climate change. Regulatory and legal drivers represent critical external drivers that can stimulate or constrain private sector engagement. While appropriate regulatory frameworks, policies and incentives can drive private sector adaptation, missing or deficient regulatory and policy frameworks

will have the opposite effect. A lack of economic incentives to invest in climate resilience, policies and incentive structures that distort price signals (e.g. subsidies on certain seeds, fertilisers or irrigation water), low institutional capacity and poor business environments will constrain the private sector's ability to respond to climate change risks and take advantage of new opportunities (Agrawala et al, 2011; Begum and Pereira, 2015; OECD, 2015; Trabbachi and Mazza, 2015). Many businesses are unable to overcome these type of structural barriers to adaptation (Ballard et al, 2013). This is particularly true for private sector and SMEs in developing countries, where they already suffer from a poor business enabling environment. In addition, the involvement of domestic private sector and SMEs in adaptation in developing countries is further constrained by social and economic constraints and uncertainties (Trabacchi and Stadelmann, 2013). While businesses may have started to recognise the risks and opportunities from climate change, a lack of effective frameworks in place to understand and manage long-term risks and opportunities from climate change constrains their ability to develop and implement adaptation measures (Begum and Pereira, 2015).

Further, market drivers also play a role, as businesses can respond to changing demand, develop new products and services, access new markets and seize new business opportunities from climate change (PWC, 2010; Agrawala et al, 2011; CDP, 2012; GIZ, 2015). This is particularly true for large companies, where there is evidence in several sectors, including agriculture, water, insurance and consulting sectors, that companies have recognised that adaptation represents a new business opportunity. For SMEs, such drivers may remain more limited if they do not have the right supporting environment to enable them to take advantage of opportunities, new markets and changing demand. On the other hand, SMEs are often seen as having greater flexibility and adaptability, and so may be able to respond to such drivers.

Box 2. Summary of key factors driving private sector adaptation.

Internal Factors

- Presence of a climate change leader/champion within the business (not limited to the business owner)
- Firm characteristics: Internal capacity; climate change relevant knowledge/expertise and skills amongst employees, and sufficient resources, including financial
- Access to resources including data, knowledge and information
- Experience of climatic impacts or awareness of risks

External Factors

- Legal and regulatory drivers to stimulate private sector adaptation
- Appropriate policies and incentive structures to engage private sector in climate change adaptation
- Economic and financial incentives to encourage and support private sector investment in climate resilience
- Market drivers can create new opportunities for the private sector from climate change

4. Framework for an enabling environment for private sector adaptation to climate change in developing countries

The previous sections identify some of the key factors required to provide an enabling environment for businesses as well as the main influencing factors (barriers and drivers) for private sector adaptation (see boxes 1 and 2 above). In this section, we combine the factors identified in these two sections to create an assessment framework to examine how developing country governments can

provide an enabling environment for private sector adaptation to climate change, in particular for SMEs in developing countries. To achieve this, we build on and expand Stenek et al's (2013) index assessment framework for an enabling environment for private sector adaptation. Stenek et al (2013) developed their framework based on a review of climate change adaptation barriers and drivers as well as interviews with six companies in several developed and developing countries to understand the most critical barriers and drivers for private sector adaptation. They identified five key priority areas, which need to be considered in an integrated manner, to support private sector adaptation: data and Information; institutional arrangements; policies; economic incentives; and communication, technology and knowledge.

The factors identified by Stenek et al (2013) are very much in line with the ones we identify in Box 2. However, a limitation of their framework is that they only focus on the elements specific to private sector adaptation. By contrast, in our approach we focus not only on elements specific to private sector adaptation, but also on the broader elements for private sector development, which may be conducive to private sector adaptation. For example, based on our review of the SME development literature, we consider 'infrastructure and markets' as a key influential factor that needs to be included in the framework. We also create a specific category on capacity development and training, as this has been identified in both the SME development and the private sector adaptation literature as a critical constraint to many firms, and in particular SMEs. Indeed, not all firms have the same level of adaptive capacity and SMEs in particular are generally considered as lacking the skills, knowledge and resources required for adaptation. We then break each influential factor down into greater detail on key private sector development and adaptation elements and provide a description of how to examine the extent to which these elements are provided within a country. Our framework and its key elements are summarised in Table 1.

This assessment framework can be applied in many ways, including to identify trade-offs and interactions between policies or initiatives surrounding private sector development, and used by developing country governments (as well as international agencies) to focus strategies to enhance private sector adaptation. By applying the framework as a whole, we can begin to better understand and assess countries' enabling environments for private sector adaptation. While our framework may seem more relevant for formal SMEs (e.g. the factors relating to institutional arrangements, regulatory framework and policies, and financial incentives), many of the factors are also highly relevant for informal SMEs, especially those relating to data and information, ICT, capacity development and training, and some of the elements under infrastructure and markets. To reach the majority of SMEs in SARs, policy makers will need to consider how to specifically tailor initiatives that can reach informal as well as formal SMEs.

Table 1. Framework for an enabling environment for private sector adaptation in developing countries

Influential factors	Key elements	Description
Institutional and governance arrangements	<ul style="list-style-type: none"> • Climate change coordinating bodies/agencies at national and regional levels • National and/or regional agencies/bodies supporting private sector development, including private sector multipliers – private sector associations/entities (e.g. chambers, business associations) • Multi-stakeholder or Public-private partnerships (MSP/PPPs) to support climate change adaptation decision making • Networks or consortia on climate change adaptation 	<ul style="list-style-type: none"> • National and/or regional bodies/agencies coordinating climate change action at national and/or regional levels • Coordinating national and/or regional bodies with a role in facilitating climate change adaptation in the private sector • National and/or regional agencies supporting the development of the private sector, and in particular SMEs • National and/or regional agencies supporting the development of the private sector and integrating climate change adaptation into their policies, programmes and plans • Private sector multipliers (e.g. chambers, business associations, industrial zone management) providing information, tools and support to businesses. • Private sector multipliers providing specific climate change information, tools and support to businesses. • MSPs or PPPs dedicated to supporting climate change adaptation decision making in the private sector. These can be partnerships or collaborations between a variety of private sector actors (e.g. large and small businesses) to support climate change adaptation action and/or between government, private sector and civil society to identify challenges from climate change, provide solutions and support adaptation actions. • Networks or consortia with a role in facilitating climate change adaptation in the private sector
Regulatory/legal framework and policies	<ul style="list-style-type: none"> • Climate change adaptation policies at national and regional levels • Building standards and/or codes incorporating climate change considerations • Local zoning rules incorporating climate change considerations • Private sector development policies • Climate change considerations integrated into policies supporting development of private sector and/or SMEs 	<ul style="list-style-type: none"> • Climate change adaptation policies have been developed at national and/or regional levels. • Climate change adaptation policies and plans are taking into account climate change implications for the private sector and supporting private sector action on climate change. • Building standards and/or codes incorporating climate change impact and adaptation considerations • Local zoning rules incorporating climate change impact and adaptation considerations for new and/or existing infrastructure/buildings in areas vulnerable to climate change • National/local planning rules incorporating climate change impact and adaptation considerations into new developments • Policies supporting the development of the private sector, and in particular SMEs • Private sector/SME development policies integrating climate change considerations and identifying key support needed for private sector adaptation
Economic and Financial incentives	<ul style="list-style-type: none"> • Government incentives • Finance instruments • Climate and Adaptation Funds 	<ul style="list-style-type: none"> • Government incentives promoting climate change adaptation in the private sector • Finance instruments and programmes available and accessible to SMEs • Public and/or private finance instruments (e.g. loans, equity, guarantees) for climate change

	<ul style="list-style-type: none"> Insurance schemes 	<p>adaptation, including risk diagnostic, planning, implementation, purchase of equipment and material, and innovation/R&D measures, available to the private sector and particularly SMEs</p> <ul style="list-style-type: none"> Climate and Adaptation Funds accessible/available at the local level Climate and Adaptation Funds targeted to/available for private sector actors and in particular SMEs. Insurance schemes targeted at private sector and in particular SMEs
Data and Information	<ul style="list-style-type: none"> Climate and hydrological observations, and early warning systems Seasonal weather forecasts Climate change projections Data and information on direct and indirect impacts of climate change Information on or case studies of adaptation measures, costs and benefits Information on or case studies of community vulnerability, risk and adaptation Adaptation Decision support tools and toolkits, including standardised risk assessment tools for private sector 	<ul style="list-style-type: none"> Climate and hydrological observations available for specific sectoral and geographical needs (e.g. semi-arid areas). For example, climate observations and early warning systems available for the agriculture and livestock sectors. Downscaled seasonal weather forecasts with sector-specific needs analysed Climate change projections elaborated for specific sectoral and geographical needs (e.g. semi-arid areas). For example, climate change projections available for the agriculture and livestock sectors. Climate/hydrological observation and projection datasets available at a scale relevant to business decision-making and in a business-friendly format. National and regional data/information about climate change direct and indirect impacts relevant to private sector and elaborated for specific sectoral and geographic needs. For example, information on climate change impacts on the agriculture sector in a specific region. National and regional data/information about climate change adaptation measures, and associated costs and benefits, elaborated for specific sectoral and geographical needs. National and regional data/information about climate change adaptation measures, and associated costs and benefits relevant to business decision-making and in a business-friendly format. Information on or case studies of adaptation measures, costs and benefits for SMEs. Adaptation decision support tools specifically tailored to business needs and elaborated for specific sectoral and/or geographic needs. Adaptation decision support tools specifically tailored to the needs of SMEs. Standardised risk assessment tools for private sector, and in particular tailored for SMEs
Information and communication technologies	<ul style="list-style-type: none"> Information and communication technologies Websites/online portals on climate change adaptation 	<ul style="list-style-type: none"> Availability and market penetration of information and communication technologies (e.g. internet and mobile phones), in particular in rural and semi-arid areas Climate and adaptation information delivered through ICTs targeted at private sector and relevant to specific geographical needs (e.g. semi-arid areas) Websites/online portals providing climate change information, in particular in relevant and usable form for the private sector and SMEs

Knowledge, Capacity development and training	<ul style="list-style-type: none"> • Climate change adaptation training courses or programmes targeted at the private sector • Research institutions or centres engaged in climate change research/work • Forums/conferences on climate change • Agricultural extension and training services • Training and technology development centres 	<ul style="list-style-type: none"> • Research institutions/universities providing courses on climate change or related topics • Research institutions engaged in climate change research and developing research that can inform and support private sector action on adaptation to climate change. • Service providers for businesses, and SMEs in particular, including provision of information, tools, financing support and training on climate change adaptation • Forums/conferences organised on climate change issues and either targeted to the private sector or open to the private sector. • Agricultural extension and training services providing information and training on climate change impacts and adaptation, accessible by and targeted to the private sector and SMEs in particular • Training and technology development centres where businesses can gain access to and receive training on new equipment and technologies.
Infrastructure and Markets	<ul style="list-style-type: none"> • Road infrastructure • Water and electricity infrastructure • Markets and business zones/centres • Access to inputs, irrigation and new technologies • Public and key infrastructure incorporating climate change considerations 	<ul style="list-style-type: none"> • Well-developed road infrastructure in semi-arid areas facilitating transport and access to key urban centres and markets • Reliable supply of electricity to businesses, in particular in semi-arid areas • Well-developed and easily accessible markets for businesses in semi-arid areas • Business zones/centres created to support market activities of enterprises/businesses (e.g. Export Processing Zones (EPZ)) • Public and key infrastructure incorporating climate change impacts and adaptation into design, operations and/or decommissioning

5. Applying the framework to Senegal and Kenya

We apply our framework to Senegal and Kenya to investigate how these two countries with significant SARs are promoting or supporting climate change adaptation in the private sector and particularly in SMEs, what key elements are missing in providing an enabling environment for private sector adaptation and where action should be targeted, in particular to reach SMEs located in the SARs (see box 3 for methodology). When applying this framework, we consider not just adaptation-specific elements of the key influential factors but also those relating to private sector development more generally to examine whether some of these broader conditions and factors are in place which could favour adaptation, even if specific adaptation ones are not. We recognise that this framework is not specific to SMEs and SARs, but apply it specifically to SMEs and SARs when possible. The full framework tables applied to Senegal and Kenya are provided in Appendices 1 and 2.

Box 3. Methodological Note.

We apply the framework through a wide-ranging and extensive desktop review and analysis of all available information on each of the influential factors from websites, policies, and both grey and academic literature. However, much of this information was not available online or at least in the detail required for this process. In such cases, we contacted the relevant organisations (by email and/or phone) to gain access to the necessary documentation and information. In addition, since the start of the process we have held several informal meetings with stakeholders from relevant agencies, which have also contributed to providing the necessary information for this framework.

5.1 Applying the framework to Senegal

5.1.1 Institutional and governance arrangements

The Senegalese government recognises the importance of the private sector for its economy and has established several agencies to support the development of the private sector, as well as SMEs in particular. The key agencies for private sector are the Agency for the Promotion of Investments and Public Works (APIX²) created in 2000, and the Department for the Support of the Private Sector (DASP³) within the Ministry of Economy, Finance and Planning. In addition, in 2001 the government created structures to specifically provide support to SMEs: the department for SMEs which is now within the Ministry of Trade, Informal Sector, Consumption, Promotion of Local Products and SMEs, the Agency for the Development and Monitoring of SMEs (ADEPME⁴) and the Bureau for the Upgrade of SMEs (Direction des PME, 2014). The ADEPME recognises the high death rate of SMEs in Senegal and their struggle to compete and grow due to lack of capacity, knowledge and financing and is therefore providing specific support, information, training and financial services to SMEs (ADEPME, 2015). In addition, the National Agency for the Promotion of Youth Employment (ANPEJ⁵) is developing a portfolio of projects and programmes to support youth entrepreneurship in rural areas, the creation of micro-enterprises and activities of the informal sector (ANPEJ, 2014).

Despite the proliferation of agencies, to date none have started integrating climate change considerations into their plans, programmes and policies. Nor have they taken into account the impact that climate change could have on the private sector and SMEs, even though many of the

² APIX: Agence nationale chargée de la Promotion des Investissements et des Grands Travaux

³ DASP: Direction de l'Appui au Secteur Privé

⁴ ADEPME: Agence de Développement et d'Encadrement des Petites et Moyennes Entreprises

⁵ ANPEJ: Agence Nationale pour la Promotion de l'Emploi des Jeunes

businesses they are supporting will have experienced extreme weather events in the past and will be vulnerable to future climate change. For example, over one third of SMEs getting support from ADEPME are involved in agricultural or agri-food processing activities and thus at risk of climate change. A corporate social responsibility (CSR) initiative – RSE Sénégal – was set up in 2008 to support the development of CSR within Senegalese companies. This initiative regroups 30 large enterprises (which includes some large SMEs), as well as a group of 17 micro and small enterprises since 2014. While this initiative has set up a CSR charter that companies need to abide by, which includes the need to reduce the environmental impact of the companies' actions, climate change adaptation or mitigation considerations are not included in this charter.

Climate change adaptation in Senegal comes under the remit of the Department of Environment and Classified Establishments (DEEC⁶) within the Ministry of Environment and Sustainable Development (MEDD⁷). In addition, a national climate change committee (COMNACC⁸) was created in 1994 and became operational in 2003. The COMNACC is led and coordinated by DEEC and consists of around 60 experts from various government ministries (e.g. energy, industry, finance, infrastructure, environment, agriculture, fisheries, etc.), private sector and civil society. The private sector is represented primarily by the Union of Chambers of Commerce, Industry and Agriculture of Senegal and the National Confederation of Employers of Senegal⁹. Although a private sector representative was the president of the Committee for several years, the participation of this sector has remained limited. The COMNACC acts as a platform where experts and decision makers can engage on climate change issues (Sall et al, 2011). COMNACC is responsible for the coordination and monitoring of adaptation actions and policies at the national and local levels and for the dissemination of information on adaptation. It will be responsible for monitoring the implementation of actions identified in Senegal's Intended Nationally Determined Contribution (INDC). At the sub-national level regional climate change committees (COMRECC) have been established to increase the engagement of regions and local authorities in developing climate change mitigation and adaptation measures and to provide technical support and information on climate change. Yet, these regional committees suffer from a lack of funding, capacity and knowledge, in particular in Senegal's rural and semi-arid regions.

The separate structures for climate change adaptation and private sector development (see Box 4) highlight the lack of specific consideration and support for private sector adaptation in Senegal. Climate change adaptation policy is the remit of the DEEC and has not to date involved the private sector development agencies. None of these agencies have been engaged in climate change policies and decision making nor have they yet started taking climate change into account in their own policies and processes. They do not provide any specific advice, support, technology transfer or funds to support the development of adaptation measures by the private sector, even though these may be essential for their future growth and competitiveness. Nevertheless, the existence of private sector and in particular SME support and development agencies points to a good starting point and basis on which to build on for enabling private sector adaptation.

⁶ DEEC: Direction de l'Environnement et des Etablissements Classés.

⁷ MEDD: Ministère de l'Environnement et du Développement Durable.

⁸ COMNACC: Comité National sur les Changements Climatiques.

⁹ DECREE No. 2011-1689 of October 3, 2011 establishing the National Committee on Climate Change.

Box 4. Summary of key organisations responsible for private sector development and climate change adaptation in Senegal

Private sector development organisations

- Agency for Promotion of Investments and Public Works (APIX), including its Body for Supporting the Business Environment of Enterprises (CAEE)
- Department for the Support of the Private Sector (DASP) within Ministry of Economy, Finance and Planning
- Department for SMES within the Ministry of Trade, Informal Sector, Consumption, Promotion of Local Products and SMEs
- Agency for the Development and Monitoring of SMEs (ADEPME)
- National Agency for the Promotion of Youth Employment (ANPEJ)
- Bureau for the Upgrade of SMEs
- Department for Financing and PPPs
- Presidential Council for Investments
- RSE Sénégal

Climate change adaptation organisations

- Department of Environment and Classified Establishments (DEEC) within the Ministry of Environment and Sustainable Development (MEDD); DEEC is focal point for UNFCCC; MEDD is focal point for the Global Environment Facility (GEF)
- National Climate Change Committee (COMNACC)
- Regional Climate Change Committees (COMRECCs)

5.1.2 Regulatory framework and policies

Since the turn of the century, the Senegalese government has recognised the key role that SMEs play in its economic growth and development. In addition to establishing specific agencies to support the development of SMEs (see above), the government adopted the Framework Law on promoting and developing SMEs in 2008, developed a Sectoral Policy on SMEs in 2009 and created three funds for SME finance (see section 5.1.3). Both the Framework Law and Sectoral Policy view SMEs as the engines of growth and critical to development. They identify key barriers to SME development including, access to finance, access to markets, access to land, access to and cost of energy, lack of programmes and projects for development of SMEs, and limited support infrastructure for SMEs. The Framework Law identifies the need to improve the business environment of SMEs, better understand their characteristics and vulnerabilities, improve links with large businesses, develop technology transfer initiatives with university and research centres, and provide multi-faceted support to SMEs. The Sectoral Policy on SMEs is structured around four key strategies: improving the effectiveness of the support system of SMEs; improving the business environment; promoting SMEs' long-term access to non-financial services; and sustainability of SMEs' access to finance (République du Sénégal, 2009). Nevertheless, neither the policy nor the law mention climate change or extreme weather events as a key constraint for SME growth and development. They also fail to identify any strategies to help SMEs deal with climate change related risks.

With regards to climate change adaptation, Senegal remains like many other Least Developed Countries (LDCs) in the early stages of developing and implementing adaptation policies and projects, especially when it comes to engaging with private sector on adaptation. Indeed, Senegal suffers from a lack of capacity, knowledge and financial resources for climate change adaptation (Banque Mondiale, 2008; République du Sénégal, 2015). This is particularly true at the local level and in its SARs, where despite the presence of COMRECCs there is a lack of human, technical and financial capacity to implement adaptation programmes and plans. Even at the national level, financial

resources for adaptation are severely limited as the entire budget of the Ministry of Environment has been reduced from FCFA31.25 billion in 2011 to FCFA22 billion in 2015 further limiting its capacity to implement adaptation measures (République du Sénégal, 2015).

Senegal has no overarching climate change adaptation policy, although it is in the process of developing its National Adaptation Plan (NAP). Instead adaptation efforts for now are guided by the National Adaptation Programme of Action (NAPA), although many of its programmes are yet to be implemented. However, private sector adaptation needs are not considered in the NAPA. In 2015, Senegal submitted to the UNFCCC its Intended National Determined Contribution (INDC) report, in which the Senegalese government emphasises the ambition to integrate adaptation into its development plans and policies (République du Sénégal, 2015).

Overall, there remains a clear disconnect and lack of integration between the SME development and climate change agendas despite the recognition that both agendas are critical for the economic growth and sustainable development of Senegal. At the national level, adaptation policy has remained a remit of the DEEC and therefore has not been integrated into other Ministries, in particular the Finance or Trade Ministries. Indeed, the government of Senegal recognises in its INDC that climate change affects multiple key economic sectors and that there is a need to develop a cross-sectoral approach integrating adaptation considerations to ensure that Senegal's economic development is resilient to climate change (République du Sénégal, 2015). With regards to the private sector, this lack of integration is particularly evident.

The key overarching social, economic and development policy of Senegal, the Emerging Senegal Plan (PSE¹⁰), which recognises the importance of the private sector for its future economic growth and development, fails to fully articulate this in many of its sectoral policies and in its climate change adaptation plans and programmes. The PSE, developed in 2014, sets the vision for Senegal to become an emerging economy by 2035. It recognises that the development of the agricultural sector and the rural economy must be accompanied with the development and support of private sector and SMEs (République du Sénégal, 2014). The PSE also recognises the importance of climate change adaptation but does not go much further in terms of developing specific strategies or approaches for adaptation. In addition, it does not specifically identify the specific needs that SMEs might have to be able to adapt to climate change.

Two key policies for the development of SARs under the PSE are the Emergency Program of Community Development (PUDC¹¹) and the Programme of Relaunch and Growth of Senegalese Agriculture (PRACAS¹²). Both of these programmes have a strong focus on promoting and supporting the development of the private sector and especially micro, small and medium enterprises (MSMEs), recognise the risks to the SARs arising from climate change, and acknowledge the need to develop adaptation strategies. Yet, they still fail to connect both agendas and recognise the risks from climate change for SMEs in these SARs.

Climate change adaptation considerations are also missing in many sectoral policies, including those focusing on fishing, trade, habitat and urban planning, despite the potential impacts of climate change on these sectors. Indeed, the Ministry of Environment and Sustainable Development is seen as lacking the authority to push other ministries especially the most powerful to integrate environmental and climate change considerations in their policies (Banque Mondiale, 2008). A

¹⁰ Plan Sénégal Emergent (PSE)

¹¹ Programme d'Urgence de Développement Communautaire

¹² Programme d'Accélération de la Cadence de l'Agriculture Sénégalaise

summary of the regulatory framework and policies and climate change adaptation and private sector development is provided in Table 2.

Table 2. Summary of policies and laws focusing on private sector development, development of semi-arid areas including its private sector, and climate change adaptation

Overarching focus of policies / laws	Policies/laws	Description
Private sector development	Emerging Senegal Plan (PSE)	<ul style="list-style-type: none"> • Sets development and economic vision up to 2035; • Agriculture one of six priority sectors for 2014-2018 Priority Action Plan; • Environment, including climate change adaptation, risks and disasters recognised as critical sectors to the economy • Recognises importance of SMEs to Senegal's economy and need to develop and support private sector and SMEs.
	Framework Law on Promoting and Developing SMEs (2008)	<ul style="list-style-type: none"> • SMEs seen as engines of growth and critical to development; • Identifies need to improve the business environment of SMEs, better understand their characteristics and vulnerabilities, improve links with large businesses, develop technology transfer initiatives with university and research centres, and provide multi-faceted support to SMEs. • No mention of climate change risks.
	Sectoral Policy on SMEs (2009)	<ul style="list-style-type: none"> • SMEs seen as engines of growth and critical to development; • Structured around four key strategies: i) improving the effectiveness of the support system of SMEs; ii) improving the business environment; iii) promoting SMEs' long-term access to non-financial services; and iv) sustainability of SMEs' access to finance; • No mention of climate change risks.
	Three-year programme of reform to the business environment and competitiveness 2013-2015 (PREAC ¹³)	<ul style="list-style-type: none"> • In line with overall objectives of the PSE; • Focuses on improving investment climate and improving the private sector's access to financial and non-financial services
	Strategy for the Development of the Private Sector (2004)	<p>This Strategy aims to encourage private investment and initiatives by improving the capacity of the private sector, the effectiveness of government intervention and underlying conditions for development. It is centred around the following key issues:</p> <ul style="list-style-type: none"> • Modernising justice system • Simplifying administrative procedures linked to investments; • Enterprise finance; • Integration of private sector organisations • Professional training; • Institutional arrangements to support private sector <p>This strategy was revised in 2015 although we have not been able to access this revised version.</p>
Development of semi-arid areas	Programme of Relaunch and Growth of Senegalese Agriculture (PRACAS)	<ul style="list-style-type: none"> • Linked to PSE; • Recognises risks to rural and semi-arid zones from climate change and need to develop adaptation strategies; • Recognises need to engage and collaborate with private sector, including producer organisations, to define

¹³ PREAC: Programme triennal de réformes de l'environnement des affaires et de la compétitivité

		overarching strategies for development of the agricultural sector.
	Emergency Programme of Community Development (PUDC)	<ul style="list-style-type: none"> • Linked to PSE; • A key objective of this policy is to promote and support the development of micro, small and medium enterprises in the agriculture, livestock and fisheries sectors; • Policy also aims to enhance the capacity of local actors and professional organisations in rural entrepreneurship and leadership.
Climate change adaptation	National Adaptation Programme of Action (NAPA)	<ul style="list-style-type: none"> • Identifies water resources, agriculture and coastal areas as three key sectors; • Many programmes not yet implemented; • No mention or consideration of private sector.
	Intended Nationally Determined Contributions (INDCs)	<ul style="list-style-type: none"> • Emphasises need to integrate adaptation into development policies and plans; • Identifies broad adaptation actions for 2016-2035.
	National Adaptation Plan	Currently under development
	Integrated Territorial Climate Plans (ITCPs) for the Ferlo region and Dakar	<ul style="list-style-type: none"> • Regional development strategy which takes into account sustainable development and climate change adaptation considerations; • ITCP for Ferlo covers 5 SARs.

5.1.3 Economic and financial incentives

Senegal lacks financial resources to fund adaptation projects. There are several international funds that Senegal can access: the Least Developed Countries Fund (LDCF) and the fund of Strategic Priority on Adaptation (SPA) from the Global Environment Facility; the Adaptation Fund (to which it was the first African country to have accredited a National Implementing Entity); the Climate Investment Fund, which includes the Strategic Climate Fund; and the Green Climate Fund. The African Development Bank (AfDB) has also developed its own climate fund with the Africa Climate Change Fund (ACCF). In addition, funding can be accessed through bilateral channels with development agencies, such as the French Development Agency.

Although all of these funds are intended for all stakeholders, and some are available to the private sector, they have in general not yet been used by the private sector, and in particular SMEs, to fund their own adaptation activities. Both the Adaptation Fund and Green Climate Fund have funded projects in Senegal. The Green Climate Fund has a specific facility targeting the private sector – the Private Sector Facility, whose mandate is to “fully engage private sector investors, developers, entrepreneurs, corporations and small and medium sized enterprises (SMEs) in climate-sensitive and resilient projects throughout the developing world” (Green Climate Fund, nd). The GCF aims to directly support SMEs to adapt to climate change through its SME pilot programme. At the national level, Senegal has the National Climate Fund. It is a mechanism that captures the financing opportunities offered by the Green Climate Fund and other multilateral and bilateral funds. The fund should enable Senegal to seize the opportunities of partnerships and international funding with the goal of mobilizing US\$60 million per year (equivalent to FCFA37 billion) (MEDD, 2014).

The funding gap for SMEs in Senegal has been estimated at around FCFA500 billion (FONGIP, 2016). In response to this and to support the development of SMEs, the government has created the following three funds, which operate in complementary ways: Guarantee Fund for Priority Investments (FONGIP¹⁴), Sovereign Fund for Strategic Investments (FONSIS¹⁵) and the National Bank

¹⁴ FONGIP: Fonds de Garantie des Investissements Prioritaires.

¹⁵ FONSIS: Fonds Souverain d’Investissements Stratégiques.

for Economic Development (BNDE), which is a bank specialising in funding SMEs. FONGIP targets specific sectors, including agriculture, agro-industry, fisheries, tourism, textile and craft, all of which are key sectors of SMEs operating in SARs. Although FONGIP also targets the renewable energy sector, it does not target adaptation-specific activities. Since October 2014, FONGIP has created FOGADEV¹⁶, a sub-fund dedicated to the development of SMEs with an initial allocation of FCFA3 billion. FONSIS has a specific sub-fund dedicated to SMEs to provide funds, support and advice so that SMEs can access complementary funds from banks, including commercial banks. The BNDE, which became operational in 2014, works in tandem with FONGIP to help SMEs gain access to credit by developing new innovative forms of collateral/guarantees. However, the BNDE will only work with SMEs which have obtained a minimum level of certification or labelling from the ADEPME. An additional fund, the Shared Cost Fund, has been developed by the ADEPME to help SMEs improve their competitiveness and growth through improved business management, development of new products/markets, and facilitating access to technologies, knowledge and finance. Nevertheless, all of these funds are only available to formal SMEs, whereas in SARs informal SMEs are far more numerous.

Several insurance initiatives and funds are also available to farmers and businesses. For example, the National Company of Agricultural Insurance (CNAAS) was created in 2008 and provides a range of insurance products, including index insurance, crop insurance and livestock insurance. CNAAS targets individuals, businesses, farmer organisations and other agencies working in the agricultural or related sectors. CNAAS is a multi-stakeholder partnership between the government of Senegal, insurance and reinsurance companies in Senegal, farmer organisations and national private sector. An agricultural index insurance pilot was also implemented in 2013 to 8,000-10,000 farmers in collaboration with national and international research institutions, ANACIM and representatives of farmers' organisations (IFC, 2013). Senegal is also a member of the African Risk Capacity initiative since 2012. ARC allows governments to take out insurance against natural disasters, providing them access to immediate funds to implement rapid and planned response to support vulnerable populations to climate shocks.

5.1.4 Data and Information

In terms of overall provision of climatic data and information, Senegal has a number of agencies providing climatic, hydrological and agricultural information and seasonal forecasts and involved in a variety of research initiatives including climate change research. Senegal's national meteorological agency (ANACIM) provides seasonal weather forecasts at sub-national level and has a climate data set with temporal series exceeding 50 years for certain rainfall stations. ANACIM is piloting an early warning system for producers (agriculture and fishing) based on seasonal weather forecasts. In addition, ANACIM is involved in several climate change related projects funded by donor agencies and international research grants. ANACIM also has an agreement in place with community radio stations to broadcast seasonal climate forecasts and information throughout the rainy season in rural zones, including its semi-arid areas.

Other organisations providing climate-related information, include the Atmospheric Physics Laboratory, the Centre for Studies and Research on Renewable Energy (CERER¹⁷), which is the UNFCCC focal point for technology transfer, and various platforms including the Climate Change, Agriculture and Food Security Platform (CCASA¹⁸) and Africa Adapt. Senegal is also part of the Permanent Interstates Committee for Drought Control in the Sahel (CILSS), which also provides

¹⁶ FOGADEV: Fonds de Garantie pour le Développement des PME.

¹⁷ CERER: Centre d'Études et de Recherche sur les Énergies Renouvelables.

¹⁸ Changement Climatique Agriculture et Sécurité Alimentaire.

rainfall, hydrological and agricultural seasonal forecasts for the whole of the Sahel at the sub-national and national levels.

Despite the existence of such climate information and data, the private sector, and in particular SMEs, struggle to access and use it, because it is not communicated nor provided in a format tailored to and suitable for the private sector. To address this, ANACIM in collaboration with the World Meteorological Organisation has developed the National Framework for Climate Services (CNSC¹⁹), which brings together all providers and users of climate services to better respond to users' needs.

However, Senegal does not have many resources relating to the specific impacts of climate change, in particular at sub-national level. Indeed, Senegal lacks climate change adaptation specific projects, information or decision support tools, particularly focusing on the private sector. Limited information on adaptation costs can be found in Senegal's INDC report, which estimates overall costs of adaptation until 2035 to be US\$14,558 million (equivalent to close to FCFA9 trillion) (République du Sénégal, 2015). This covers the sectors of biodiversity, coastal zones, water resources, fisheries, agriculture, livestock, flooding and health. A sectoral breakdown of these costs is provided, although with no explanation of how these costs were measured.

Further, none of the resources, information or data available are targeted at or made in a format easily available and accessible by the private sector, and in particular SMEs. Indeed, while there are initiatives to provide and communicate seasonal climate forecasts to farmers (e.g. CGIAR's Climate Change, Agriculture and Food Security (CCAFS) West Africa Programme has developed a Climate Smart Village in the Kaffrine region), we are unaware of initiatives designed specifically for SMEs, whether formal or informal.

5.1.5 Information and communication technologies

In the early 2000s SMEs in Senegal faced key obstacles in accessing information and communication technologies (ICTs), including the complexity, cost and reliability of these technologies (Ndiaye, 2002). Since then, the provision of ICTs has expanded significantly across Senegal with three main telecommunications providers covering the majority of the country and offering high-speed internet including 3G and 4G. Senegal now enjoys a high access and use of mobile phones in both urban and rural areas, although internet use remains limited in its rural and semi-arid areas (Sylla, 2008; Cabral et al, 2011; Direction des PME, 2014). The improvement in ICTs and development of market platforms and mobile applications have enabled SMEs to gain better access to economic and market information. In addition, such information is also shared via the network of the Observatory on Information Systems, Networks and Road Information for Senegal (OSIRIS²⁰), Trade Point Senegal, and specialised radios (e.g. Trade FM radio, although this is limited to the Dakar area).

Despite the improved coverage of ICTs in Senegal's SARs, the quality of the telecommunication networks and the cost of accessing these services remain key obstacles for SMEs. Overall, rural SMEs and particularly informal SMEs still have a very limited access to internet (Sylla, 2008; Cabral et al, 2011; Direction des PME, 2014). Agricultural information and early warning services tend to be broadcast through community radio stations, rather than through mobile texting services. However, ANACIM has been piloting a mobile texting service for producers in the agriculture and fisheries sectors, which could prove to be a more affordable and accessible service for rural and informal SMEs.

¹⁹ CNSC: Cadre National pour les Services climatiques.

²⁰ OSIRIS: Observatoire sur les Systèmes d'Information, les Réseaux et les Inforoutes au Sénégal.

Although there are many structures to support SME development, there is a lack of communication about these to SMEs and as a result they are often unaware of the different support measures they could receive. In addition, there is a lack of communication and dissemination of climate change specific information and thus of how SMEs could adapt to climate change. Online resources on adaptation in relevant and usable form for the private sector and SMEs are entirely lacking. Due to the lack of use of ICTs for private sector development and adaptation we have been unable to find more information on this issue, which highlights a key gap in the provision of an enabling environment for private sector adaptation.

5.1.6 Knowledge, capacity development and training

Just as with the previous section, there is limited information available on knowledge, capacity development and training specific to private sector development and adaptation. Senegal has several universities and research centres with courses, programmes and research focusing on agriculture, environmental issues, land management and development with some focus on climate change within these courses and programmes (specific examples provided in Appendix 1). Overall, specific programmes on climate change adaptation are in their infancy and there remains in particular, a lack of programmes and capacity development and training courses that can support private sector action on climate change adaptation²¹.

However, there are several organisations which provide information and agricultural training directly to farmers, including the Higher Institute of Agricultural and Rural Training and the Centre for Agricultural Improvement. The Climate Smart Village concept developed by CGIAR's Climate Change, Agriculture and Food Security (CCAFS) West Africa Programme is another example of an initiative providing training and information to farmers, although it is unclear whether it also targets businesses and SMEs directly. Various platforms, including Africa Adapt and the Climate Change, Agriculture and Food Security Platform (CCASA) also produce and disseminate climate-related information. The organisation RSE Senegal organises an annual CSR forum for the private sector (including SMEs), but it has yet to integrate climate change considerations into its activities and its forums have not to date considered the issue of climate change. The national agency ADEPME has opened a Technology Development Centre where SMEs can learn about, receive training for and buy new technologies and equipment. Senegal also has specific centres to support the development of female-led enterprises. Although none of these centres cover the issue of climate change, they could nonetheless in the future be used as a place where SMEs come to discuss the technologies, equipment and techniques needed to support their adaptation to climate change.

5.1.7 Infrastructure and Markets

The semi-arid and rural areas of Senegal suffer from a lack of access to infrastructure, including water, electricity, road and transport infrastructure (ANSD, 2009). While SMEs in SARs have access to local markets their access to national or international markets are a lot more restricted due to inadequate road and transport infrastructure (Mbengue, 2007; Wade, 2010). The government of Senegal has created specific business zones/centres and industrial parks to help support market

²¹ While higher education and post-graduate adaptation programmes may not seem directly relevant for SME development and adaptation, the SME development and private sector adaptation literatures reviewed in sections 2 and 3 highlight the importance of entrepreneurs' education levels as well as a skilled labour force as key factors in SME development, growth and adaptive capacity. Universities and research centres could contribute to the development of SMEs' adaptive capacity by providing specific training courses for SMEs on climate change adaptation. In addition, the provision of post-graduate programmes and courses on climate change adaptation can enhance the specific skill set of organisations working with and supporting businesses, which in turn can improve the provision of climate-related advice, information, tools and training services to SMEs.

activities of businesses, although most of these exist in the urban areas (e.g. in Dakar) and outside of the SARs. In addition, the most functional infrastructure is concentrated in the Dakar region. Public and key infrastructure also fail to incorporate climate change impacts into their designs. In addition, many of the SARs in Senegal risk getting cut off from major cities and roads because of floods during the rainy season. To address the rural area's lack of access to basic infrastructure and markets, the Senegal government is implementing the PUDC programme (see above), with a strong focus on improving agricultural and livestock productivity, promoting entrepreneurial capacity and supporting the development of SMEs.

5.2 Applying the framework to Kenya

5.2.1 Institutional and governance arrangements

The Ministry of Environment, Natural Resources and Regional Development Authorities is responsible for the coordination of climate change response in Kenya and is the national focal point for the UNFCCC. A National Climate Change Secretariat, established within the Ministry, represents the government's primary technical agency for climate change response (Government of Kenya, 2015). It is responsible for revising the climate change policy and proposing new legislation, overseeing the implementation of the climate change strategy and action plans (i.e. National Climate Change Response Strategy, and the National Climate Change Action Plan 2013-2017), coordinating UNFCCC related activities (e.g. the Intended Nationally Determined Contributions (INDCs)) and ensuring national compliance and enforcement. The National Climate Change Secretariat is also expected to support the counties in developing and implementing their county level climate change action plans (Government of Kenya, 2013a). In addition, there are several other departments within the Ministry of Environment, Natural Resources and Regional Development Authorities which play a role in the national climate change response, including the Directorate of Environment (DoE), Kenya Meteorological Department (KMD) and National Environment Management Authority (NEMA) – the latter is accredited as a National Implementing Entity for the Adaptation Fund.

Yet, climate change planning is not solely confined to the Ministry of Environment, with several other ministries involved in mainstreaming, financing and implementing adaptation programmes, including the Ministries of Planning and National Development, Finance and National Treasury, and Agriculture. The National Drought Management Authority (NDMA), established in 2011 under the Ministry of Devolution and Planning, is seen as the principal instrument of Government for the delivery of all policies and strategies that relate to drought management and climate change adaptation in arid and semi-arid lands (ASALs). Climate Change Units and Desk Offices have also been established in most ministries, departments and institutions. County governments are also responsible for implementing climate change plans and policies and many of them have not only established climate change units but have also gone further to develop County Climate Change Fund Regulations/Bills.

Finally, the recently signed Climate Change Bill proposes the establishment of a National Climate Change Council which will have legal functions and responsibilities in coordinating and advising climate change-related activities between all stakeholders across all levels of government (including county governments). The Council would be directly responsible to the Office of the President and would represent interests of a cross-section of stakeholders, including public, private, academia, research and non-state actors.

In terms of private sector development, several agencies are responsible for the development and support of the private sector and SMEs in particular, including the Ministry of Industry, Trade and Cooperatives, the Micro and Small Enterprise Authority (MSEA), Kenya Industrial Estates Ltd, Kenya National Chamber of Commerce and Industrialization, Micro-Enterprises Support Programme Trust

(MESPT), Kenya Livestock Marketing Council (KLMC), the PPP Unit in the Ministry of Finance and National Treasury (see Table 3). All of these agencies aim in various ways to create an enabling business environment for all types of enterprises (from micro to large enterprises), enhance their access to markets and finance and increase their skills and capacity.

These agencies have put in place a number of initiatives to promote SME development. For example, the Ministry of Industry, Trade and Cooperatives launched the Micro, Small and Medium Enterprises (MSME) Competitiveness Project. This project was initiated to increase productivity and employment in SMEs by improving their access to finance, improving the business environment and strengthening enterprise skills and markets linkages to meet the demands of SMEs. In addition, the Ministry established the MSEA for the promotion, development and regulation of the Micro and Small Enterprises (MSE) Sector in Kenya. The Kenya National Chamber of Commerce and Industry (KNCCI) has developed specific programs to support the growth and development of MSMEs, including tailor-made support on their strategy development, business registration, exports development, business regulations and business plans preparation, entrepreneurship and industrial incentives. The MESPT provides products and support services (e.g. loans, grants, capacity building, training, etc.) to producers, SMEs and financial intermediaries. MESPT also has a Business Services Programme designed to address competitiveness constraints of MSMEs in selected value chains in order to increase market access for Kenyan producers and enterprises, with particular emphasis on rural producers, women and youth.

The private sector players in Kenya, under their umbrella body, Kenya Private Sector Alliance (KEPSA) have also taken a leading role on climate change matters. KEPSA is very active in helping the private sector, including SMEs, manage climate change risks and access opportunities. KEPSA established the Climate Business Information Network (CBIN), is actively engaged in the development of the National Climate Change Action Plan, undertakes assessments of climate change impacts on Kenya's private sector and produces the "Climate Change and Your Business" briefing note series. In addition, KEPSA provides information directly to businesses, including a list of climate change funds and programmes available to businesses, and a report on publically available tools and frameworks that businesses can use to assess climate risk (Murphy, 2014). KEPSA also holds bi-annual talks with the Head of State under the Presidential Roundtables and every two months with respective Ministries under the Ministerial Stakeholders Forum.

Table 3. Summary of key agencies for private sector development and climate change adaptation in Kenya

	Agencies	Description
Private sector development	Ministry of Industry, Trade and Cooperatives	<ul style="list-style-type: none"> • Create enabling environment for a globally competitive, sustainable, industrial, enterprise and cooperative sector through appropriate policy, legal and regulatory framework • Projects focusing on promoting and developing SMEs (e.g. the MSME Competitiveness Project)
	Micro and Small Enterprise Authority within Ministry of Industry, Trade and Cooperatives	<ul style="list-style-type: none"> • Established for the promotion, development and regulation of the micro and small enterprises (MSEs) sector; • Aims to coordinate, harmonise and facilitate integration of various public and private policies, programmes and activities related to MSEs; • Aims to enhance MSEs' access to markets, provide suitable facilities and funding for MSEs, and enhance entrepreneurial and technical skills of MSEs.
	Kenya Industrial Estates Limited	<ul style="list-style-type: none"> • Established to facilitate development and incubation of MSMEs by establishing industrial parks, providing credit and business development services
	Kenya National Chamber of Commerce and Industrialization	<ul style="list-style-type: none"> • Advocates for creation of a favourable commercial, trade and investment environment that supports enterprise expansion; • Membership consists of MSMEs as well as large corporations; • Specific programmes to support growth and development of SMEs • Tailor-made support on MSME strategy development, business registration and regulations, exports development, entrepreneurship and industrial incentives.
	Micro-Enterprises Support Programme Trust (MESPT)	<ul style="list-style-type: none"> • Aims to promote economic growth, employment creation and poverty alleviation through support to micro enterprises; • MESPT works with and brings together producers, SMEs and financial intermediaries; • Provides variety of products and services including loans, grants, capacity building, consultancy and training, partnerships and collaborative programmes; • Business Services Programme designed to address competitiveness constraints of MSMEs in selected value chains.
	Public Private Partnership (PPP) Unit in the Ministry of Finance and National Treasury	<ul style="list-style-type: none"> • Established to promote and oversee the implementation of the government's PPP programme; • Committed to improving and strengthening the environment for private sector participation in Kenya.
	Kenya Livestock Marketing Council	<ul style="list-style-type: none"> • Umbrella organisation of livestock producers and traders in arid and semi-arid areas; • Aims to promote livestock marketing, improve pastoralists' livelihood and reduce their vulnerability to climatic changes and extremes.
	KEPSA	<ul style="list-style-type: none"> • Umbrella body that brings together business community (including SMEs) to engage and influence public policy to improve business environment in Kenya.
Climate change adaptation	Ministry of Environment, Natural Resources and Regional Development Authorities (focal point for UNFCCC):	<ul style="list-style-type: none"> • National Climate Change Secretariat responsible for revising climate change policy and proposing new legislation, overseeing implementation of climate change strategy and action plans, coordinating UNFCCC related activities, and ensuring compliance and enforcement;

<ul style="list-style-type: none"> • National Climate Change Secretariat • Directorate of Environment • Kenya Meteorological Department • National Environment Management Authority (national implementing entity for the Adaptation Fund) 	<ul style="list-style-type: none"> • Provide support to Counties in developing and implementing their climate change action plans
National Climate Change Council (to be established)	<ul style="list-style-type: none"> • Legal functions and responsibilities in coordinating and advising climate change-related activities between all stakeholders across all levels of government; • Responsible to Office of President
Ministry of Planning and National Development	<ul style="list-style-type: none"> • Leads the process to mainstream climate change into national development plans, including Medium Term Expenditure Frameworks (MTEFs) and Vision 2030 (Government of Kenya, 2013a); • Works with the Ministry of Environment, Natural Resources and Regional Development Authorities to analyse impacts of climate change on national development (Government of Kenya, 2013a).
Ministry of Finance and Treasury	<ul style="list-style-type: none"> • Responsible for allocation of funds from the exchequer towards climate change activities
National Drought Management Authority, within Ministry of Devolution and Planning	<ul style="list-style-type: none"> • Delivery of climate change adaptation policies and strategies in ASALs.
Climate Change Units established in government ministries and departments	<ul style="list-style-type: none"> • Coordinate climate change related issues within each ministry/department
Kenya Private Sector Alliance (KEPSA)	<ul style="list-style-type: none"> • Represents all types of private sector, including SMEs (they are members of KEPSA under an association of SMEs). • Very active in helping private sector manage climate change risks and access opportunities; • Has established the Climate Business Information Network (CBIN), which promotes information and experience sharing between businesses and helps private sector understand risks and opportunities from climate change; • Engaged in development of the National Climate Change Action Plan • Undertakes assessments of climate change impacts on private sector • Produces 'Climate Change and Your Business' briefing note series; • Provides information directly to businesses, including a list of climate change funds and programmes available to businesses; • Holds regular talks and meetings with various Ministries.
County governments	<ul style="list-style-type: none"> • Many county governments have established climate change units and some have developed County Climate Change Fund Regulations/Bill

5.2.2 Regulatory framework and policies

The Kenyan government acknowledges and emphasises the role of the private sector as a driver of growth, employment and poverty reduction in its policies and strategies. Kenya's Vision 2030, which is the country's main overarching development policy, describes the country as 'committed to an export-led private sector-driven growth strategy' (Government of Kenya, 2007). Its emphasis on private sector is found in its strategies across its six priority sectors and three pillars of economic, social and political governance. The Vision recognises the importance of not just large corporations but also of SMEs and the informal sector. The Kenyan government has also developed specific private sector development strategies. In particular, the Private Sector Development Strategy (PSDS) (2006-2010) focuses on the government's commitment to provide an enabling environment to enhance private sector growth and competitiveness (Government of Kenya, 2005). The PSDS specifically notes that MSMEs are central to the link between private sector and poverty reduction, and represent important instruments for income distribution and equitable gender participation (Government of Kenya, 2005). However, the strategy recognises that many barriers still remain which hinder the involvement of the private sector, including weak institutional capacity, caveats in policy and legislation, and poor management of natural resources. The MSE Authority has also enacted the Micro and Small Enterprise Act (2012) to provide for the promotion, development and regulation of micro and small enterprises.

The Kenyan government has also placed a strong emphasis on dealing with the challenge of climate change. It has prioritised the need to mainstream climate change, with national strategic plans and legislative and executive frameworks designed to address climate change in a sustainable and integrated framework (Nachmany et al, 2015), in line with the 2011 East African Community Climate Change Policy (EACCCP). The Constitution of Kenya (2010) provides the basis for the formulation of adaptation and mitigation legislation and policies as it guarantees the right to a clean and healthy environment and states the commitment to an ecologically sustainable development. In addition, Kenya's Vision 2030 recognises that climate change represents a key challenge that the country will face. Indeed, it recognises the need to enhance disaster preparedness and improve the capacity for climate change adaptation. It also recognises that its ASALs are strongly affected by extreme weather events and the need to promote adaptation activities in these zones. The inclusion of climate change adaptation in Vision 2030 should help its integration in medium-term plans, sectoral plans, ministries' strategic plans and county development plans (Nzau, 2013). The second medium term plan of Vision 2030 (2013-2017) emphasises the importance of climate change mitigation and adaptation measures and aims to incorporate climate change programmes and projects into the next planning cycle (Nzau, 2013). In addition, at county level climate change adaptation has been mainstreamed in some County Development Plans (CIDPs).

Climate change considerations have also been integrated in various sectoral policies. For example, the National Environment Policy (NEP), finalised in 2013, recognises the challenge that climate change represents to the sustainable management of natural resources and the socio-economic development of the country and proposes eight key actions on climate change (Government of Kenya, 2013b). The Environmental Management and Coordination Act (EMCA 1999) is the government's principle instrument for the management of the environment and provides the relevant institutional framework for the coordination of environmental management, including Kenya's National Climate Change Action Plan and the establishment of the National Environment Management Authority, which is the national implementing entity for the Adaptation Fund (Government of Kenya, 2013a). In addition, the government has committed to integrating climate change adaptation into agricultural development programmes and policies. The Kenya Climate Smart Agriculture Framework Programme (KCSAFP) 2015-2030, has been developed to set guidelines for implementing Climate Smart Agriculture (CSA) approaches, strategies, practices and technologies. The programme highlights the roles and responsibilities of key private sector actors including KEPSA,

financial institutions and insurance companies, in providing a variety of products and services including entrepreneurship investment facilities, input supply, provision of credit, guarantees to farmers and businesses including SMEs, value chain development and provision of insurance services.

In addition, the Kenyan government has developed specific national climate change policies, strategies and action plans (see Table 4 for greater detail). In 2010, the government launched the National Climate Change Response Strategy (NCCRS), which represents Kenya's first climate change agenda and provides a basis for focusing nationwide action on climate change adaptation and mitigation. The NCCRS followed a participatory process that brought together government, private sector, civil society, development agencies, women and youth groups and the public. The key focus of the NCCRS is to ensure that climate change adaptation and mitigation are integrated in all government planning and development objectives. To implement the NCCRS, the government implemented the National Climate Change Action plan (NCCAP 2013-2017). The Action Plan aims to ensure that climate change actions support Kenya's achievement of development goals and the attainment of Vision 2030, and to guide Kenya's transition towards low carbon climate resilient development (Government of Kenya, 2013a).

In 2014, the Ministry of Environment, Natural Resources and Regional Development Authorities developed a draft National Climate Change Framework Policy to facilitate a coordinated, coherent and effective response to the local, national and global challenges and opportunities from climate change. Kenya also has a Climate Change Act, which was signed into law in May 2016. The Act provides the legal and institutional framework for climate change mitigation and adaptation. It aims to facilitate and enhance the response to climate change and provide guidance and measures for achieving low carbon climate-resilient development. Kenya's Intended Nationally Determined Contribution (INDC) identifies key priority adaptation actions, including actions specific to the private sector, such as: enhancing adaptive capacity and resilience of the informal private sector; creating an enabling environment for the resilience of private sector investment, and demonstrating an operational business case; and enhancing the resilience of the agriculture, livestock and fisheries value chains by promoting climate smart agriculture and livestock development (Government of Kenya, 2015).

Table 4. Summary of policies and laws focusing on private sector development, development of semi-arid areas including its private sector, and climate change adaptation

Overarching focus of policies / laws	Policies/laws	Description
Private sector development	Vision 2030	<ul style="list-style-type: none"> • Recognises importance of large corporations as well as SMEs and informal sector • Emphasis on private sector found across its strategies
	Private Sector Development Strategy (2006-2010)	<ul style="list-style-type: none"> • Government committed to providing an enabling environment to enhance private sector growth and competitiveness • Recognises barriers to private sector development, including weak institutional capacity, caveats in policy and legislation • Recognises that MSMEs are central to the link between private sector and poverty reduction and represent important instruments for income distribution and equitable gender participation
	Micro and Small Enterprise Act (2012)	<ul style="list-style-type: none"> • Establishes rules and institutions to support micro and small businesses in Kenya
Development of semi-arid areas	National Policy for the Sustainable Development of Northern Kenya and other Arid Lands	<ul style="list-style-type: none"> • Focuses on climate resilience and requires government to find solutions to address climate challenges
Climate change adaptation	Vision 2030	<ul style="list-style-type: none"> • Recognises climate change represents a key challenge to Kenya • Recognises specific vulnerability of ASALs to climate change and need to promote adaptation in these regions • Second medium term plan emphasises importance of climate change adaptation
	National Environment Policy (NEP) (2013)	<ul style="list-style-type: none"> • Proposes eight key actions on climate change, including implementing a comprehensive National Climate Change Policy; • Emphasises role of private sector and civil organisations in environmental conservation and management.
	Environmental Management and Coordination Act (EMCA 1999)	<ul style="list-style-type: none"> • Provides institutional framework for coordination of environment management, including Kenya's National Climate Change Action Plan and establishment of the National Environment Management Authority
	East African Community Climate Change Policy (EACCCP)	<ul style="list-style-type: none"> • Provides regulatory, institutional and legislative framework to guide harmonisation, coordination and implementation of climate change initiatives in East African Community Partner States (EAC Secretariat, 2011b) • Advises countries to mainstream adaptation into development planning
	National Climate Change Response Strategy (2010)	<ul style="list-style-type: none"> • Kenya's first climate change agenda • Key focus was to ensure climate change adaptation integrated in all government planning and development objectives

	National Climate Change Action Plan (NCCAP 2013-2017)	<ul style="list-style-type: none"> • Implementation of plan dependent on private sector; • Aims to ensure that climate change actions support Kenya’s achievement of development goals and attainment of Vision 2030; • Sets recommendations to improve enabling environment for climate change adaptation and mitigation with a focus on finance, institutional, regulatory and policy frameworks, knowledge management and capacity development, and technology; • Identifies specific adaptation actions for ASALs, including provision of accessible climate information to farmers and pastoralists, insurance schemes, mainstreaming climate change into agricultural extension services, and climate-proofed infrastructure development.
	Draft National Climate Change Framework Policy (2014)	<ul style="list-style-type: none"> • Aims to enhance adaptive capacity and build resilience to climate change, and promote low carbon development pathways • Recognises specific vulnerability of ASALs • Promotes green jobs
	Kenya Climate Change Act (2016)	<ul style="list-style-type: none"> • Provides legal and institutional framework for climate change mitigation and adaptation • Proposes establishment of a National Climate Change Council • Proposes to have a Climate Change Directorate as government’s lead agency on national climate change plans and actions and to provide technical assistance to county governments • Proposes creation of Kenya Climate Fund as a financing mechanism for priority climate change actions
	Kenya Climate Finance Policy 2015	<ul style="list-style-type: none"> • Establishes legal, institutional and reporting frameworks to access and manage climate finance • Aims to further Kenya’s national and county development goals through enhanced mobilisation of climate finance that contributes to low carbon climate resilient development goals
	County Adaptation Funds	<ul style="list-style-type: none"> • Financing mechanisms devolved to Counties that fund resilience activities and enhance absorptive capacity at community level.
	Kenya’s Intended Nationally Determined Contribution (INDC)	<ul style="list-style-type: none"> • Identifies key priority adaptation actions, including actions specific to the private sector : <ul style="list-style-type: none"> ▪ Enhancing adaptive capacity and resilience of the informal private sector; ▪ creating an enabling environment for the resilience of private sector investment, and demonstrating an operational business case; ▪ enhancing the resilience of the agriculture, livestock and fisheries value chains by promoting climate smart agriculture and livestock development

5.2.3 Economic and financial incentives

In Kenya, there are several funds from banks, micro-finance institutions, cooperatives, government instruments and international institutions (e.g. Development Bank of Kenya, East African Development Bank, Cooperative Bank of Kenya, Kenya Women Finance Trust, Small and Micro-Enterprise Programme (SMEP) micro finance bank) that businesses can access to finance their activities and the development of their business (Entrepreneur's Toolkit, 2012). Nevertheless, these tend to be accessible only to formal and larger businesses. Some specific funds have been set up for SMEs and for businesses in ASALs. For example, the Micro and Small Enterprise Fund was set up in 2015 through the Micro and Small Enterprises Act 2012. This Fund aims to finance the promotion and development of MSEs, provide them with affordable and accessible credit, and finance research, development, innovation and the transfer of technology. However, the Fund has not yet been operationalised. The Kenya Commercial Bank Foundation also launched in 2015 an interest-free Ksh1 billion revolving fund for livestock farmers in ASALs.

The government of Kenya is also trying to encourage commercial banks to provide loans to agricultural businesses, which are generally viewed as risky, with a directive requiring commercial banks to allocate 10% of their portfolio to agriculture. The African Green Revolution Alliance (AGRA) is working with private banks to address their lack of lending to smallholders through its Programme for Rural Outreach of Financial Innovations and Technologies (PROFIT). This Programme aims to lessen the risks of lending to agriculture and develop appropriate financial products for farmers and agro-based enterprises (LTS International and Acclimatise, 2012b). It has supported the development of innovative financial products, including savings and remittance services, community infrastructure loans, value chain financing and index-based weather insurance. With the credit guarantees that it provides with its partners AGRA is able to leverage up to ten times the amount in low-interest loans (LTS International and Acclimatise, 2012b).

Insurance companies in Kenya provide index-based weather insurance and index-based livestock insurance to small scale farmers and herders (LTS International and Acclimatise, 2012b). For example, CIC Insurance provides a crop insurance product in partnership with the Cooperative Bank of Kenya to insure crops for farmers taking loans from the bank against yield losses due to extreme weather events (LTS International and Acclimatise, 2012b). UAP insurance is providing a weather index-based micro insurance policy named "Kilimo salama" (meaning safe agriculture) for small-scale farmers, which allows them to pay their insurance premium through their mobile phones. Within the livestock sector in the ASALs, APA insurance and Takaful insurance are providing index based livestock insurance (IBLI) for pastoralists.

With regards to climate change adaptation, there are several international climate funds that Kenya can access: The Special Climate Change Fund (SCCF) and the fund of Strategic Priority on Adaptation (SPA) from the Global Environment Facility; the Adaptation Fund; the Climate Investment Fund, which includes the Strategic Climate Fund; and the Green Climate Fund (GCF). In addition, the African Development Bank (AfDB) has also developed its own climate fund with the Africa Climate Change Fund (ACCF). There is also the East African Community (EAC) Climate Change Fund, which aims to increase the capacity of EAC partners to mobilise existing, new and additional climate change funds from both international and domestic sources (EAC Secretariat, 2011a). The GCF is of particular interest for the private sector because of its Private Sector Facility which aims to engage with SMEs in climate-sensitive and resilient projects. Another example of GCF engagement with the private sector is its newly signed funded activity agreement with Acumen Fund (a private sector accredited entity), which allows Acumen to receive financial resources from the GCF to invest in businesses along the off-grid energy value chain to increase access to off-grid solar power in East Africa, including Kenya (GCF, 2016).

At the national level, the Climate Change Bill proposes the creation of a Kenya Climate Fund as a financing mechanism for priority climate change actions approved by the Council. At the county level, a devolved Climate Adaptation Fund has been piloted in four arid and semi-arid counties. This fund aims to build the capacity of local communities and county governments to identify, prioritise and fund plans at local level to promote adaptation and climate resilient development (Hesse and Pattison, 2013). If successfully implemented this fund will provide an example of a way to channel national and global climate funds at the local level (Hesse and Pattison, 2013). The four pilot counties are also at an advanced stage of approving their county Climate Change Fund legislations, which will provide local communities with access to climate finance (Kiiru, 2014). Nevertheless, how accessible these funds are to the private sector and SMEs in particular remains a key question.

5.2.4 Data and Information

In terms of overall provision of climatic data and information, Kenya has a number of agencies providing climatic, hydrological and agricultural information and seasonal forecasts. The Kenya Meteorological Department (KMD) is the designated institution mandated to collect and store climate data for Kenya. It provides meteorological and climatological services to several sectors including the private sector (KMD, 2015). It also produces a variety of seasonal forecasts (daily, five days, seven days, monthly and seasonal weather forecasts) but these are often not disseminated in an accessible way in Kenya's remote ASALs (Hesse and Pattison, 2013).

With the University of Nairobi, KMD has also developed downscaled climate models. Although, the highly variable rainfall across ASALs and the lack of weather station coverage mean that downscaled forecasts are sometimes inaccurate when it comes to ASALs (Hesse and Pattison, 2013). At the county level, the county director of meteorology provides downscaled weather forecasts. The Department of Resources Survey and Remote Sensing (DRSRS) and the Climate prediction and application centre (ICPAC) at the Intergovernmental Authority on Development (IGAD) Climate also produce hydrological observations and seasonal climate information products. In addition, ICPAC, KMD and NDMA produce early warning bulletins for Kenya's SARs. The Ministry of Environment, Natural Resources and Regional Development Authorities also has a dedicated website on the NCCAP, which provides evidence of key climate risks and impacts on sectors and includes the Adaptation Technical Analysis Reports. However, these products are not specifically tailored to suit the needs of the private sector, particularly SMEs.

Nonetheless, there are several resources that the private sector in Kenya can access to get data and information on climate change relevant to their businesses. For example, KEPSA provides specific information and resources on private sector adaptation. Through KEPSA, Kenyan businesses can receive specific information on climate change funds they can access and on tools and frameworks that can help them assess climate risks on their businesses. In addition, KEPSA can undertake climate change impact assessments for businesses. The CBIN also provides a useful resource for information and experience sharing on climate change issues between businesses.

With regards to adaptation costs, an overall estimate of total adaptation costs can be found in Kenya's INDC and a sectoral breakdown of the costs in the third technical report for the Government of Kenya's Adaptation Technical Analysis (LTS International and Acclimatise, 2012a). This report also contains a small section on adaptation costs to the private sector, which provides an example of adaptation costs to one business, but highlights the general lack of knowledge and information on private sector adaptation costs. The Stockholm Environment Institute (SEI) also produced in 2009 a comprehensive study on the economics of climate change in Kenya, with initial estimates on adaptation costs for Kenya as a whole and for some specific sectors, although there is no analysis of specific costs to the private sector (SEI, 2009).

Overall, there is still a lack of climate change data and information specific to the private sector, especially SMEs in SARs, and provided in a way that is understandable and usable by the private sector, as well as a lack of decision support tools to help the private sector adapt to climate change.

5.2.5 Information and communication technologies

Mobile phones are widely used in Kenya's SARs, although there is a more limited use of internet. Some Kenyan firms have developed mobile phone applications that help farmers and businesses access insurance products and make claims (KEPSA, 2014). There are various SMS based platforms where businesses can get information on market prices and availability of various agri-products. Radio stations also normally broadcast weather and agricultural information in local languages and some showcase successful farmers and agro-enterprises for others to learn from. In Isiolo county the pilot programme of the CAF resulted in a community radio station being set up to disseminate seasonal climate information 'county-wide' in local languages (Hesse and Pattison, 2013). Such initiatives have also been carried by other organisations, including by CARE through its Adaptation Learning Programme. Overall, however the use of ICTs by SMEs in SARs, in particular to support their adaptation to climate change, remains limited.

5.2.6 Knowledge, capacity development and training

Kenya has several universities, research centres and institutions with courses and programmes focusing on agriculture, environmental issues and development, with some focus on climate change modelling, mitigation and adaptation within these courses and programmes. The University of Nairobi has an Institute for Climate Change and Adaptation which offers postgraduate training. The Kenya Agricultural and Livestock Research Institute (KARLO) provides research and development on relationships between climate variability and change and agricultural crops and livestock production. KARLO also leads the development of new technologies, especially in the agricultural and livestock sectors. In addition, Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC) are implementing a joint initiative called the 'Tripartite Programme on Climate Change Adaptation and Mitigation'. This initiative aims to strengthen capacity in national research and training institutions, support development of research programmes and implement climate change vulnerability assessments and analysis (COMESA et al, 2011). While all these courses and programmes can lead to general capacity building they do not specifically target the needs of the private sector and hence will not necessarily strengthen SMEs' ability to adapt to climate change. Capacity development and training services focusing on the adaptation needs of the private sector and especially SMEs are very rare. Agricultural extension agents provide specific capacity development and training services but these are primarily tailored towards small scale farmers and pastoralists. Nevertheless, they will provide services and information for any business that comes to them. An example of specific support for the private sector is the Kenya Climate Innovation Centre, established through international funding from several donor agencies. It provides incubation, capacity building services and financing to the private sector to deliver innovative climate change solutions in the energy, water and agribusiness sectors (KCIC, 2016). Non-governmental organisations, such as the Kenya Market Trust, also provide targeted capacity development, training and support services for the private sector, including SMEs, and act as a bridge between government agencies and businesses.

5.2.7 Infrastructure and Markets

Kenya's SARs suffer from insufficient and/or inadequate road, water, electricity and marketing infrastructure, which is a major barrier to SME growth in these areas. Nevertheless, this is something the national and county governments are trying to address. In particular, the need to climate proof infrastructure (energy, transport, buildings and ICT) was identified as a priority adaptation action in Kenya's INDC. The national government is already taking some steps to climate proof physical and marketing infrastructure by ensuring compliance with and enforcement of appropriate regulations.

The government has set up specific institutions to ensure compliance in these different sectors. For example, the government set up the National Construction Authority to streamline, overhaul and regulate the construction industry and promote international best practices and standards.

6. Lessons learnt for Senegal and Kenya

A growing discourse is developing amongst national and international agencies around the need to engage the private sector in adaptation to climate change. There is a growing expectation that SMEs, and the private sector at large, will play an increasingly important role in climate change adaptation in the next 10 years (Pauw and Pegels, 2013). Given the scale of the climate change challenge, the investment that will be required to address it and the limited public funds available, especially within developing countries, reliance on public sector alone for adaptation will not be sufficient. As a dominant driver of economic growth the private sector will be a crucial resource for climate change adaptation and a fundamental stakeholder in the transition to climate-resilient development. Yet, very little research has looked at what it means to engage the private sector in adaptation and how to create an enabling environment to stimulate such engagement, in particular in developing countries.

The framework presented in this paper has allowed us to investigate the extent to which Senegal and Kenya are providing an enabling environment for private sector and SME adaptation and the key gaps where greater efforts are needed. Based on the findings provided in Section 5, we have developed a summary figure for each country (see Figure 1 for Senegal and Figure 2 for Kenya) outlining the extent to which favourable conditions for private sector adaptation are provided for each of the influential factors. Policy makers can use such assessments to identify the gaps in the enabling environment for private sector adaptation, and where better coordination between structures, agencies or policies may be needed.

In these figures, we have classified the countries' efforts towards providing conditions conducive to private sector and SME adaptation according to four categories:

1. Conditions favourable to private sector adaptation, with a focus on private sector needs for adaptation;
2. Some favourable conditions for private sector development and adaptation, with some specific targeting of private sector adaptation needs but key gaps remain;
3. Some favourable conditions for private sector development and/or adaptation, but no specific targeting of private sector adaptation needs with key gaps remaining; and
4. Too many conditions required to promote private sector adaptation are not available.

We recognise that these categories are qualitative in nature, but argue that they nevertheless provide a useful and relevant assessment of a country's enabling environment for private sector adaptation. In addition, it should be noted that although category 1 represents the most favourable status it does not mean that no further efforts are required to support private sector adaptation.

Categories 2 and 3 allow us to differentiate between measures supporting private sector development generally (category 3), recognising that these are an essential first step and may be conducive to adaptation, and measures providing some support for private sector adaptation specifically (category 2). For example, in Figure 2 we suggest that the financial instruments accessible to SMEs come in category 3 as there are now several funds targeting SMEs, but as yet none of these funds provide specific support for SMEs' adaptation efforts. In contrast, we argue that Kenya's climate change policies fall in category 2, as some of these policies, such as the INDC, identify adaptation actions specific to the private sector. The INDC prioritises actions to enhance the adaptive capacity of the informal private sector and create an enabling environment for the resilience of

private sector investment. However, Kenya’s climate change policies do not fall into category 1 as the focus on supporting private sector adaptation is not consistent or sufficiently prevalent across all of its climate change policies.

Unsurprisingly, category 1 is the least represented across both figures, and is in fact not present in Figure 1 for Senegal. However, we do find two elements that fall into this category in Figure 2: climate change coordinating bodies and agencies at national and regional level, and the networks or consortia on climate change adaptation. Indeed, in Kenya it is a legal requirement that the private sector must be involved in all policies and regulations, including climate change ones. In addition, the National Climate Change Council, which is yet to be established, is legally responsible for coordinating and advising climate change-related activities between all stakeholders, including the private sector. Further, the private sector, including SMEs, is directly engaged with Ministries through KEPSA, which regularly meets with the ministry of the environment through the ministerial stakeholder forum where climate change issues are discussed. KEPSA is very strongly engaged in climate change policies, in efforts to disseminate and communicate climate change information (e.g. KEPSA produces a list of climate change funds, publicly available climate risk assessment tools and frameworks that businesses can use) to the private sector, and more generally in supporting private sector efforts to specifically manage climate change risks.

Institutional arrangements	CC coordinating bodies & agencies at national & regional level	National/regional agencies for private sector development	PPPs to support adaptation decision making	Networks or consortia on climate change adaptation	
Regulatory Framework & Policies	CC adaptation policies at national/regional level	Private sector development policies	Building standards &/or codes	Local zoning rules	
Economic and Financial incentives	Government incentives	Financial instruments (accessible to SMEs)	Climate and Adaptation Funds	Insurance schemes	
Data & Information	Climate Observations & early warning systems	Climate change projections	Direct/indirect impacts of climate change	Adaptation measures costs and benefits & case studies of adaptation	Adaptation decision support tools
Information & Communication Technologies	Climate and adaptation information delivered through ICTs	Online portals on climate change adaptation			
Knowledge, Capacity development & Training	Adaptation training courses for private sector	Research institutions	Forums for private sector	Agricultural extension and training services	Training & technology development centres
Infrastructure & Markets	Road & transport Infrastructure	Water & electricity infrastructure	Markets & business centres/zones	Access to inputs, irrigation & new technologies	Public & key infrastructure incorporating CC considerations

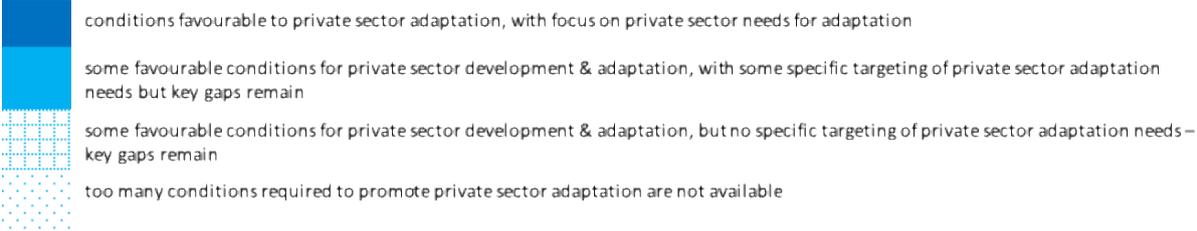


Figure 1. Assessing the conditions for private sector adaptation in Senegal

Institutional arrangements	CC coordinating bodies & agencies at national & regional level	National/regional agencies for private sector development	PPPs to support adaptation decision making	Networks or consortia on climate change	
Regulatory Framework and Policies	CC adaptation policies at national/regional level	Private sector development policies	Building standards &/or codes	Local zoning rules	
Economic & Financial incentives	Government incentives	Financial instruments (accessible to SMEs)	Climate and Adaptation Funds	Insurance schemes	
Data & Information	Climate Observations & early warning systems	Climate change projections	Direct/indirect impacts of climate change	Adaptation measures costs and benefits & case studies of adaptation	Adaptation decision support tools
Information & Communication Technologies	Climate and adaptation information delivered through ICTs	Online portals on climate change adaptation			
Knowledge, Capacity development & Training	Adaptation training courses for private sector	Research institutions	Forums for private sector	Agricultural extension and training services	Training & technology development centres
Infrastructure & Markets	Road & transport Infrastructure	Water & electricity infrastructure	Markets & business centres/zones	Access to inputs, irrigation & new technologies	Public & key infrastructure incorporating CC considerations

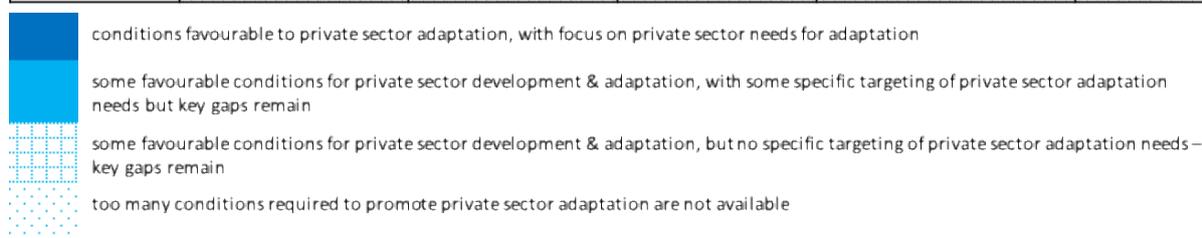


Figure 2. Assessing the conditions for private sector adaptation in Kenya

Figures 1 and 2 reveal that much remains to be done in both countries. Senegal, however, appears somewhat behind Kenya when it comes to providing an enabling environment for private sector adaptation, as none of the elements we have assessed across the influential factors fall in categories 1 or 2. This highlights that there are as yet no measures, initiatives, policies or agencies specifically targeting private sector adaptation. This is not entirely surprising given that adaptation policy in Kenya is further advanced than in Senegal, where the NAPA represents the only national plan on adaptation. In this regard Senegal is similar to many other LDCs, where private sector engagement in adaptation has received limited attention (Pauw and Pegels, 2013). While Kenya appears further advanced in terms of supporting private sector adaptation, the limited number of elements falling into category 1 highlights that this support is still in its early stages and not sufficiently widespread across the different elements and factors.

Senegal remains in the early stages of developing and implementing adaptation policies and strategies at national and local levels and is yet to engage the private sector in this process. Nevertheless, Figure 1 reveals that some favourable conditions do exist that could form the basis of greater targeted efforts and support for private sector adaptation. Although Senegal has dropped down the World Bank's Doing Business ranking in the last 10 years (ranked 166 out of 185 in 2012), and the private sector is suffering from a lack of access to finance, infrastructure, markets and public services, the country has embarked on a range of reforms to reduce restrictive business regulations and government practices (AfDB, 2013a). In addition, agencies and policies specifically targeting SMEs have been created. Yet, supporting private sector and SME adaptation, in particular in Senegal's SARs will require greater and more focused efforts across all of the elements identified in this framework. Indeed, applying the framework to Senegal has revealed that there remains a clear

disconnect between the SME development and climate change agendas despite the recognition that both agendas are critical for the economic growth and sustainable development of Senegal.

Specifically, it is apparent from our review that there is a lack of integration across private sector/SME development and climate change policies and programmes. Despite the overlaps and synergies in objectives between these policies and programmes, they have to date remained separate and there have not been any attempts to better coordinate their implementation. The framework presented in this paper can help to identify some of these overlaps and synergies. Indeed, new policy measures are not always needed and existing synergies can be reinforced once they are identified. The identification of misalignments within existing regulatory frameworks and policies can also lead to revisions and improvements in policy making (OECD, 2015). For example, Senegal's PSE recognises the importance of the private sector for its future economic growth, the need to support SME development in rural areas and the need to adapt to climate change but fails to connect those agendas. Indeed it fails to consider how the private sector and SMEs might be specifically impacted by climate change and supported to adapt to these impacts. A better integration of the PSE, and its programmes focusing on SME development in SARs (e.g. PUDC and PRACAS), with climate change policies could result in a better targeting of measures required to support SME adaptation.

The national adaptation planning process can provide an opportunity to connect the private sector development and climate change agendas. To date, national adaptation plans across developing countries have paid limited attention to the role of the private sector and how governments can create an enabling environment to stimulate and incentivise domestic private sector adaptation (Pauw and Pegels, 2013). While Senegal's NAPA is in line with this trend, as it does not consider private sector adaptation needs, the ongoing development of Senegal's National Adaptation Plan does represent an opportunity to address this and provide a stronger focus on private sector adaptation and a greater integration with Senegal's development policies. This need for greater integration has been acknowledged within Senegal's INDC. Senegal's National Adaptation Plan could also be used as an opportunity to specifically target SMEs, including those in SARs, in line with its recent policies promoting entrepreneurship and SME development in SARs.

In addition, there is a lack of communication, interaction and collaboration between the agencies responsible for these separate agendas at both national and local levels. For example, climate change considerations have to date not been integrated within the development plans of the agencies responsible for private sector and SME development, such as the ADEPME. As the key cross-agency platform on climate change, the COMNACC could potentially act as a bridging agent or intermediary between the agencies responsible for private sector and SME development and climate change adaptation. In particular, it could certainly strive to increase and broaden the engagement of those responsible for private sector development in its activities and meetings. The COMNACC does already include some private sector representatives but their involvement to date has been minimal and a more diverse representation from the private sector, including from SMEs, would be beneficial.

Overall, in Kenya the institutional arrangements and policies on climate change adaptation are further advanced and show a stronger consideration of private sector needs. For example, in Kenya the private sector (ranging from SMEs to large corporations) is represented by KEPSA which has taken a very active role on climate change matters and takes part in regular meetings with all relevant ministries. Nevertheless, as highlighted by Figure 2 there are still many aspects that could be strengthened to further improve the institutional and regulatory environment for private sector, and particularly SME, adaptation. While large and formal businesses (including SMEs) appear to be relatively well represented and engaged in the development of climate change policies, it is unclear how well informal and female-led enterprises are represented, if at all. This is of particular concern for SARs, where informal SMEs dominate. Finding ways to increase the representation and participation of these businesses will be important to support the adaptation needs of SMEs in SARs.

Beyond this need to improve horizontal communication between the different ministries/agencies, there is also an evident need to improve 'vertical' communication between the private and public sectors. An improved public-private dialogue/communication could be fostered in a variety of ways. For example, multi-stakeholder stakeholder platforms could be used as a means of bringing in public and private sector actors to discuss climate change adaptation issues. Once again these platforms would need to involve of all types of businesses to ensure they also represent the needs of informal or female-led SMEs. Another approach is to consider the role of intermediaries and private sector associations/entities, such as business/trade chambers and business associations, as entry points in starting a dialogue with the private sector. These umbrella organisations speak the business language and can provide information, tools and support to businesses and can be used to reach a greater number of businesses and therefore act as business multipliers.

However, improving only the institutional and regulatory environment is not sufficient. Figures 1 and 2 reveal that there are gaps across all the elements required to provide an enabling environment for private sector adaptation and improvements in these will be just as important, with a specific targeting of the needs of SMEs in SARs. It is important to recognise the differing capacities between SMEs and larger or multinational companies and there is a need to tailor approaches depending on businesses' adaptive capacities (Ballard et al, 2013). SMEs in SARs tend to be more informal, have lower levels of skills and resources, and face greater constraints, especially with regards to access to finance, infrastructure, markets and government services, than larger and more urban SMEs (Lemma et al, 2015). The implications of these specific characteristics for adaptation need to be recognised by governments and specific support provided to address these. For example, the lack of access to financial services is a key constraint not only for SME development and growth but also for their ability to respond to the risks from climate change and take advantage of opportunities that climate change may present. While there are an increasing number of adaptation funds available to national governments, the local level suffers from a paucity of adaptation funding. The majority of these funds are also not available for the private sector and even less so for SMEs, especially informal ones. Figures 1 and 2 reveal the lack of financial instruments and climate adaptation funds available to SMEs.

In addition, in both Kenya and Senegal there is a clear lack of research, training and information services targeted at supporting private sector and SME adaptation. Yet SMEs in SARs already suffer from a lack of human and technical skills and capacities, so a greater targeting of support and training services is critical to help them put adaptation measures in place. SMEs need to gain greater access to data and information tailored to their needs and scales of operation as well as to innovations and new technologies. Improvements in these services may also have a better chance of reaching and having an impact on informal SMEs, which are prevalent in SARs, compared with improvements in the institutional, regulatory and financial environment which tend to primarily target formal SMEs located in the larger urban areas. However, both Senegal and Kenya are lacking in the provision of such services and technologies, in particular for semi-arid SMEs. Indeed, in Senegal most of the government efforts have centred on Dakar, where 82% of SMEs are located. Figures 1 and 2 reveal that there are gaps at all levels for Kenya and Senegal when it comes to the provision of information and services for private sector adaptation: in developing data and information at the right scale and in a format understandable to private sector; in availability of agricultural extension and training services and their provision of adaptation information for SMEs; in the availability and use of ICTs to communicate information and messages on adaptation; in the existence and access to technology training and development centres; and in decision support tools developed to support private sector adaptation.

Key gaps also exist with regards to providing appropriate infrastructure to enable SMEs to grow and develop. In Senegal, while the government has invested in many large infrastructure projects and created business centres, these tend to be concentrated in the Dakar region with a neglect of SARs.

Greater investment in and climate-proofing of infrastructure in SARs will be necessary to allow SMEs in these areas to become more resilient to climate change. Kenya seems to be taking some first steps towards this with the need to climate-proof infrastructure recognised as a key adaptation priority in its INDC.

7. Conclusion

Small to medium sized enterprises (SMEs) form a critical part of the economy in developing countries and particularly in their rural and semi-arid regions (SARs), where they provide important employment opportunities. Yet, they operate in a difficult business environment, with multiple constraints affecting their growth and development, including a weak institutional environment and limited access to finance, markets, infrastructure and transport (Castells-Quitana et al, 2015; Lemma et al, 2015). Climate change will further exacerbate the constraints faced by SMEs in SARs through disruption to production systems and a loss of capital, as well as a likely increase in water scarcity, reduced energy security and disruption to transportation systems (Lemma et al, 2015). The ability of SMEs to adapt to climate change will have significant implications for the economic development of SARs. Yet, this ability will in part depend on the way governments at local, national and international levels address the challenge from climate change and how they support the private sector, and SMEs in particular, in meeting that challenge.

In this paper, we provide a framework to better understand the key elements of an enabling environment for private sector adaptation and apply it to Senegal and Kenya to reveal where improvements are required to create conditions conducive to private sector and SME adaptation. This framework reveals that both Senegal and Kenya have taken action to provide these conditions and to strengthen the competitiveness of their private sectors. Yet, much remains to be done. Further research is required to better understand the specific constraints and barriers that SMEs in SARs face to adapt to climate change and how to strengthen their adaptive capacity to better support their adaptation planning. In addition, it is important to consider how to strengthen the engagement of SMEs and private sector more generally in adaptation decision and policy-making to better take account of their specific needs and priorities. This would help to develop more appropriate policies and initiatives to support private sector adaptation. Many of these issues are being investigated in the next phase of this PRISE project.

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APPENDIX 1. APPLYING THE FRAMEWORK TO SENEGAL

Influential factors	Key elements	Description
Institutional and governance arrangements	Climate change coordinating bodies/agencies at national and regional levels	<p>Overall</p> <ul style="list-style-type: none"> • Ministry of Environment and Sustainable Development (MEDD in French) • Department of Environment and Classified Establishments (DEEC in French) within the MEDD – focal point for UNFCCC and Designated National Authority for the Adaptation Fund • Others Departments of the Ministry of Environment and Sustainable Development • National Climate Change Committee (COMNACC in French) • Centre of Ecological Monitoring (CSE in French), • National Civil Aviation and Meteorological Society (ANACIM) – IPCC focal point in Senegal • Ecowas Observatory for Renewable Energy and Energy Efficiency (ECREEE) (CERER in French) • Climate Change, Agriculture and Food Security Platform (CCASA/Senegal in French – Part of COMNACC). • Permanent Interstates Committee for Drought Control in the Sahel (CILSS in French) • AFRICAN UNION/CEA • Economic Community Of West African States (ECOWAS) Global Alliance for Resilience Initiative – Sahel and West Africa (AGIR in French) <p>Semi-arid areas</p> <ul style="list-style-type: none"> • Regional Climate Change Committees (COMRECC in French) • Regional Inspectorate for Water and Forests (IREF in French) • National Civil Aviation and Meteorological Society (ANACIM) • Climate Change Agriculture and Food Security Platform (CCASA/Senegal)
	National and/or regional agencies supporting private sector development, including private sector multipliers – private sector associations / entities (e.g. chambers, business associations)	<ul style="list-style-type: none"> • Agency for the promotion of investments and public works (APIX in French) (2000), including its body for supporting the business environment of enterprises (CAEE) • Department for the support of the private sector (DASP in French) within the Ministry of Economy, Finance and Planning • Department for SMEs within the Ministry of Trade, Informal Sector, Consumption, Promotion of Local Products and SMEs • Agency for the Development and Monitoring of SMEs (ADEPME in French) • Bureau for the upgrade of SMEs • Department for Financing and PPPs • Ministry for Women, Family and Childhood, including the Department on Women Organisations and Women Entrepreneurship • National Agency for the Promotion of Youth Employment (ANPEJ in French) – developing several projects and programmes to support youth entrepreneurship in rural areas, creation of micro-enterprises and activities of the informal sector, including: Programme to support creation of micro enterprises (PAME), Programme to support informal sector actors (PASI), and Project to support the promotion of youth entrepreneurship in rural areas (PAJER). • Presidential Council for Investments • Corporate Social Responsibility Network (RSE Senegal) • Senegalese Agency for Intellectual Property and Technological Innovation (ASPIT) • Economic Groups of Senegal (GES)

		<ul style="list-style-type: none"> • National Union of Traders and Industrialists of Senegal (UNACOIS) • Organisation of Traders, Farmers, Craftsmen and Industrialists of Senegal (OCAAIS) • Food Technology Institute (ITA) <p>Associations and networks focusing on women entrepreneurs:</p> <ul style="list-style-type: none"> • Union of Women Entrepreneurs/Business Leaders of Senegal (UFCE) • African Network for the Support of Women’s Entrepreneurship (RASEF) • Association of Trade and Business Women (AFAC) • Network of Young Women Entrepreneurs (REJEFE) • Women Association for the Promotion of Enterprises in Senegal (AFEPES) • Forum of Women Business Leaders for Women Entrepreneurship in Senegal (FEFS) • Solidarity of Women Leaders (SOFEL) • Association of Women Entrepreneurs in Senegal (AFEPES) • Collective of Women Business Leaders of the Movement of Enterprises in Senegal (CFD/MEDS) <p>Semi-arid areas</p> <ul style="list-style-type: none"> • Regional Chambers of Commerce, Industry and Agriculture • Regional Chambers of Craft/Business– overarching structure for craft enterprises <hr/> <p>Multi-stakeholder or Public-private partnerships (MSP/PPPs) to support climate change adaptation decision making</p> <p>Overall</p> <ul style="list-style-type: none"> • Department of Green Financing and Partnership / Support program for the creation of green jobs (PACEV in French) • Department for Financing and PPPs • National committee of climate change (COMNACC in French) • Corporates Social Responsibility Network (RSE Senegal in French) - promoting CSR in businesses • Senegalese Forum of public-private partnerships • National Agency for Eco-Villages (ANEV) • However, there is an overall lack of formal functional framework for public-private partnership in the climate change sector <p>Semi-arid areas</p> <ul style="list-style-type: none"> • Regional Climate Change Committees (COMRECC in French) • Corporate Social Responsibility Network (RSE Senegal) <hr/> <p>Networks or consortia on climate change adaptation</p> <p>There do not appear to be any networks or consortia on climate change adaptation</p>
<p>Regulatory/legal framework and policies</p>	<p>Climate change adaptation policies at national and regional levels</p>	<p>Specific climate change policies - overall:</p> <ul style="list-style-type: none"> • National Adaptation Plan – under development • National Adaptation Programme of Action (NAPA) (2006) • Intended Nationally Determined Contributions (INDC) (2015) • Integrated Territorial Climate Plan (PCTI in French) – for Dakar region <p>Climate change policies - Semi-arid areas</p>

		<ul style="list-style-type: none"> Integrated Territorial Climate Plan (PCTI in French) – for Ferlo region <p>Other policies integrating climate change considerations - overall:</p> <ul style="list-style-type: none"> Emerging Senegal Plan (PSE in French) – recognises importance of climate change adaptation but no specific strategies or approaches for adaptation developed Policy on the development of the environment sector and sustainable development (Lettre de politique de developpement du secteur de l’environnement et du developpement durable (LPD/SEED) 2016-2020). <p>Other policies integrating climate change considerations – semi-arid areas:</p> <ul style="list-style-type: none"> Programme of Relaunch and Growing of Senegalese Agriculture (PRACAS in French) – recognises risks to rural and semi-arid areas from climate change and need to develop adaptation strategies
	Building standards and/or codes incorporating climate change considerations	Building standards do not yet incorporate climate change considerations
	Local zoning rules incorporating climate change considerations	Local zoning rules do not yet incorporate climate change considerations
	Private sector development policies	<p>Overall</p> <ul style="list-style-type: none"> Emerging Senegal Plan (PSE in French) Framework Law on promoting and developing SMEs (2008) Sectoral Policy on SMEs (2009) Three-year programme of reform to the business environment and competitiveness 2013-2015 (PREAC in French) Presidential Investment Council <p>Semi-arid areas</p> <ul style="list-style-type: none"> Emergency Programme of Community Development (PUDC in French) – strong focus on promoting and supporting development of private sector and in particular MSMEs Programme of Relaunch and Growth of Senegalese Agriculture (PRACAS) – recognises need to engage and collaborate with private sector, including producer organisations
	Climate change considerations integrated into policies supporting development of private sector and/or SMEs	Climate change considerations not yet integrated into policies supporting private sector and SME development
Economic and Financial incentives	Government incentives promoting adaptation in private sector	No specific government incentives promoting adaptation in the private sector
	Finance instruments accessible to businesses and SMEs in particular	<ul style="list-style-type: none"> Government funds: <ul style="list-style-type: none"> Guarantee Fund for Priority Investments (FONGIP) – targets specific sectors, including agriculture, agro-industry, fisheries, tourism, textile and craft – key sectors of SMEs operating in semi-arid areas; has sub-fund FOGADEV dedicated to development of SMEs Sovereign Fund for Strategic Investments (FONSIS) – has a specific sub-fund dedicated to SMEs National Bank for Economic Development (BNDE) – works in tandem with FONGIP to help SMEs gain access to credit

		<ul style="list-style-type: none"> • Shared Cost Fund developed by ADEPME to help SMEs improve their competitiveness and growth • However, all of the above funds are only available to formal SMEs, whereas many SMEs in semi-arid areas are informal • Development Fund for Technical Education and Professional Training (FONDEF in French) • Private sector banks: e.g. National Bank of Agricultural Credit of Senegal (CNCAS in French), Alliance of Credit and Savings for Production (ACEP), Mutual Credit of Senegal (CMS) • National Fund for the Promotion of Female Entrepreneurship (FNPEF in French) • Ministry for Microfinance and Inclusive Economy – provides finance to SMEs and specifically to women-led SMEs although funding is highly politicised • Microfinance institutions: e.g. Partnership for Mobilizing Savings and Credit in Senegal (PAMECAS in French) • National Agency for the Promotion of Youth Employment (ANPEJ in French) – provides finance for SMEs although actual disbursement of funds has been very limited. • Project to support the promotion of youth and women employment (PAPEJF in French) - Available: http://papejf.com/index.php?option=com_content&view=article&id=58&Itemid=58 – five-year project (2014-2019), with three key axes: 1) promotion of youth and women entrepreneurship in rural and peri-urban areas; 2) Technological support infrastructure to MSMEs; and 3) finance mechanisms accessible to youth and women. PAPJEF is seen as a key project in operationalising the Emerging Senegal Plan (PSE) and its Priority Action Plan. Focuses primarily on supporting the development of MSMEs in agricultural and services value chains. <p>Semi-arid areas</p> <ul style="list-style-type: none"> • Alliance of Credit and Savings for Production (ACEP) • Partnership for Mobilizing Savings and Credit in Senegal (PAMECAS) • Mutual Credit of Senegal (CMS) • PAPJEF – Kaolack, Fatick, Thies
	Climate and Adaptation Funds	<ul style="list-style-type: none"> • International Climate Funds: <ul style="list-style-type: none"> ▪ Least Developed Countries Fund (LDCF) ▪ Special Climate Change Fund (SCCF) ▪ Strategic Priority on Adaptation (SPA) fund from the Global Environment Facility ▪ Adaptation Fund ▪ Climate Investment Fund (includes Strategic Climate Fund and Green Climate Fund (which has a Private Sector Facility)) ▪ GEF Small Grants Programme ▪ Africa Climate Change Fund from the African Development Bank
	Insurance schemes	<ul style="list-style-type: none"> • National Company of Agricultural Insurance (CNAAS in French) – provides range of insurance products, including index insurance, crop insurance and livestock insurance; targets individuals, businesses, farmer organisations in agricultural or related sectors • Senegal is a member of the African Risk Capacity Initiative since 2012 • Agricultural index insurance pilot implemented in 2013 to 8000-10,000 farmers

Data and Information	Climate and hydrological observations, and early warning systems	<p>Overall</p> <ul style="list-style-type: none"> • Climate data available at the National Agency of Civil Aviation and Meteorology (ANACIM in French) with temporal series exceeding 50 years for certain stations. Access to annual data is free. • Daily broadcasting on weather (ANACIM) • Newsletters on weather (rainfall, temperature, strong swells) developed by several institutions like ANACIM, Department of Agriculture, Department of Livestock, Food Security Commission, Centre of Ecological Monitoring (CSE in French), etc. • Hydrological data available at the Organisation of the Development of the Senegal River (OMVS in French), Organisation of the Development of the Gambia River and ANACIM. • Geohydrological data available at the Department of Management and Planning of Water Resources • Mainly radio and TV broadcast information on weather and extreme events (agreement between ANACIM and the Union of Community Radios (URAC) for the broadcasting of climate information • Droughts: information and data provided by ANACIM, CSE, the Permanent Interstates Committee for Drought Control in the Sahel (CILSS), Executive Secretariat of the National Council for Food Security (SE/CNSA in French), National Institute of Soil Science (INP in French), the Focal Point of PAN-LCD at Department of Forestry • Floods: Reports and data from Ministry of Urban Renewal and Living environment, National Fire Brigade, Civil Protection Department (DPC in French), City Development Agency (ADM in French), National Office of Sanitation of Senegal (ONAS in French) • Soil salinization from National Institute of Soil Science (INP in French), Department of Forestry, Senegalese Institute for Agricultural Research (ISRA in French) • Bushfires: data and report at the DEFCCS, CSE • Atmospheric Physics Laboratory produces climate-related information • Centre for Studies and Research on Renewable Energy (CERER in French), which is the UNFCCC focal point for technology transfer, produces climate-related information • Various platforms including the Climate Change, Agriculture and Food Security Platform (CCASA) and Africa Adapt also produce and disseminate climate-related information • CGIAR's CCAFS West Africa programme has developed in Kaffrine a climate smart village where farmers work with researchers and other local partners to test a range of climate-smart technologies and practices. <p>Semi-arid areas</p> <ul style="list-style-type: none"> • Climate data recorded in the stations of ANACIM in semi-arid regions • Broadcasting of climate information by URAC • Drought: data recorded in the stations of ANACIM in semi-arid regions by INP • Floods at Saint-Louis, data provided by Local authorities, ADM, Regional Fire Brigade • Project on climate change and food security towards rural population, conducted by ANACIM in different areas including Louga - broadcasts climate information by SMS, local radio stations and newsletters.
	Seasonal weather forecasts	<ul style="list-style-type: none"> • Newsletters on weather (rainfall, temperature, strong swells) developed by several institutions like ANACIM, Department of Agriculture, Department of Livestock, Food Security Commission, Centre of Ecological Monitoring (CSE in French), etc. • Seasonal forecasts available from ANACIM and AGRHYMET/CILSS, including for arid and semi-arid areas of Senegal
	Climate change projections	<ul style="list-style-type: none"> • INDC and NAPA contain some information on climate change projections for Senegal – although information in NAPA is from earlier models (NAPA was completed in 2006)

		<ul style="list-style-type: none"> Climate projections for Senegal available at the Laboratory of Physic of Atmosphere (LPA)/Dakar University, Department of Environment and Classified Establishments (DEEC in French) and ANACIM.
	Data and information on direct and indirect impacts of climate change	<p>Overall</p> <ul style="list-style-type: none"> INDC and NAPA contain some information on climate change impacts Project on climate change and food security towards rural population, conducted by ANACIM in different areas including Louga - broadcasts climate information by SMS, local radio stations and newsletters Projections on crop yields by Directorate of Analysis, Forecasting and Agricultural Statistics (DAPSA), Department of Agriculture, CSE, and Company for the planning and development of Delta lands (SAED) for the river area Destruction of infrastructure because of coastal erosion, etc. – data provided by Department of Environment and Classified Establishments (DEEC in French), Civil Protection Department (DPC in French), Town Planning Department, High Authority for the Coordination of Maritime Safety, Maritime Security and Protection of the Marine Environment (HASSMAR). <p>Semi-arid regions</p> <ul style="list-style-type: none"> Projections on crop yields in the river area at Saint Louis by SAED Destruction of infrastructures affected by coastal erosion, etc. (data available at DRECC: Regional subdivisions of DECC)
	Information on or case studies of adaptation measures, costs and benefits	<p>Overall</p> <ul style="list-style-type: none"> INDC has limited information on adaptation costs, with an overall estimate of the costs of adaptation until 2035 of USD 14,558 million; sectoral breakdown of costs provided but with no explanation of how they were measured. National Adaptation Programmes of Action (NAPA) – costs provided for some specific adaptation activities or measures Contingency Plan for the Republic of Senegal (http://www.servicepublic.gouv.sn/assets/textes/plan_de_contingence.pdf) - this plan contains information on adaptation measures in response to floods, locust invasions and epidemics, Integrated Territorial Climate Plan (PCTI in French) National Strategy and National Action Plan for Biodiversity Conservation – has a strategic focus on ecosystem resilience and several adaptation actions including their costs National Strategy for Marine Protected Areas – contains information on adaptation measures and costs Platform of science-policy dialogue on climate change, agriculture and food security in Senegal (C-CASA) Africa Adapt website (http://www.africa-adapt.net/en-us/) National Strategy for Sustainable Development (SNDD) – contains several adaptation measures but no information on costs or benefits. Draft available at: http://www.denv.gouv.sn/documents/CNDD/DRAFT_2_%20SNDD.pdf Research publications on climate change in Senegal (e.g. Senegal Country Situation Assessment by Gaye et al, 2015) <p>Semi-arid areas</p> <ul style="list-style-type: none"> Integrated Territorial Climate Plan (PCTI in French) for the Ferlo region and for Dakar region Municipal Development Plan (PDC in French) – planning document for local governments, which in theory include adaptation measures and their costs. District Development Plan (PDD in French) – planning document for districts, which in theory include adaptation measures and their costs
	Information on or case studies of community vulnerability, risk and adaptation	<ul style="list-style-type: none"> Several organisations, including the Ministry of Environment and Sustainable Development, Senegalese Institute of Agricultural Research (ISRA in French) and COMNACC, may have information on or case studies of community vulnerability, risk and adaptation

		<ul style="list-style-type: none"> Platform of science-policy dialogue on climate change, agriculture and food security in Senegal (CCASA platform) Africa Adapt website (http://www.africa-adapt.net/en-us/) <p>Semi-arid areas</p> <ul style="list-style-type: none"> Research centres of ISRA Specific Projects and Programmes operating in semi-arid areas (e.g.: the Food Security Project ‘PASA Lou-Ma-Kaf’) CCASA platform Centre of support for local development (CADL) – overarching structure for all technical services, and development programmes and projects at the local level
	Adaptation Decision support tools and toolkits, including standardised Risk Assessment Tools for private sector	No specific adaptation decision support tools and toolkits developed for the private sector
Information and communication technologies	Information and communication technologies	<ul style="list-style-type: none"> High access and use of Internet in urban areas but low use of internet in rural areas Very high access and use of mobile phones in urban and rural areas Economic and market information shared via OSIRIS (Observatoire sur les Systèmes d'Information, les Réseaux et les Inforoutes au Sénégal) Trade Point Senegal (TPS) – platform of services using internet technologies, meeting and training hub, distribution portal for economic and commercial information to promote best practices in business and trade in Senegal Radio station (Trade FM) broadcasting programmes in Dakar area, but aiming to broadcast in other Senegalese areas. Community Radio stations – these form a Union for Community Radio Stations (URAC – Union des Radios Communautaires)
	Websites/online portals on climate change adaptation	No specific websites or online portals on climate change adaptation, and in particular targeted at the private sector.
Knowledge, Capacity development and training	Climate change adaptation training courses or programmes targeted at the private sector	No specific adaptation training courses or programmes targeted at the private sector
	Research institutions or centres engaged in climate change research/work	<ul style="list-style-type: none"> Universities and research centres have courses, programmes and research focusing on agriculture, environmental issues, land management and development with some focus on climate change within these courses and programmes Masters on Corporate Social Responsibility (RSE in French) at University of Dakar and Polytechnic School of Thies PhD Programme in Economics of climate change at the Université Cheikh Anta Diop in Dakar (Economics and Management Sciences Faculty) in partnership with the programme WASCAL. Global Masters in Development Practice (MDP) at the Université Cheikh Anta Diop in Dakar (Economics and Management Sciences Faculty) on key sustainable development challenges including poverty, health, climate change and agricultural productivity. Masters in Environmental Sciences at the Université Cheikh Anta Diop in Dakar (Institute of Environmental Sciences) Masters in Oceanography, Meteorology and Management of arid environments at the Université Cheikh Anta Diop in Dakar (Ecole Supérieure Polytechnique) focusing on Meteorology, climate change, modelling, and atmospheric and ocean physics. Masters in Sustainable Development and Environmental Management at the Université Aaloune Diop de Bambey with a strong component on climate change Bachelor in Environmental Sciences and Sustainable Ecosystems (African Institute of Development Studies) with two teaching

		<ul style="list-style-type: none"> units: i) climate change: science and impacts; and ii) climate change: society and human dimensions Overall, specific climate change adaptation programmes are in their infancy
	Forums/conferences on climate change	<ul style="list-style-type: none"> Preparatory Forum of COP National Youth Forum on climate change Africa Adapt (online forum)
	Agricultural extension and training services	<ul style="list-style-type: none"> Agricultural training and extension services provide agricultural information and training services to farmers Various platforms including the Climate Change, Agriculture and Food Security Platform (CCASA) and Africa Adapt also produce and disseminate climate-related information Several organisations which provide information and agricultural training to farmers, including the Centre for professional horticultural training (CFPH), Higher Institute of Agricultural and Rural Training (ISFAR), 'Ecole Nationale Supérieure' of Agriculture (ENSA), Centre for Agricultural Improvement (CPA), Training Centre for Agricultural Technicians and Agricultural Engineering, National Training Centre for Irrigated Agriculture (CNFCI) CGIAR's CCAFS West Africa programme has developed in Kaffrine a climate smart village where farmers work with researchers and other local partners to test a range of climate-smart technologies and practices.
	Training and technology development centres	<ul style="list-style-type: none"> ADEPME's Technology Development Centre where SMEs can learn about, receive training for and buy new technologies and equipment Senegalese Incubator of Innovative Companies Incubation Center and Enterprise Development for Women and Youth Centre for Professional and Technical Training (CFPT in French /Senegal-Japon)
Infrastructure and Markets	Road infrastructure	<ul style="list-style-type: none"> Semi-arid areas suffer from a lack of access to road and transport infrastructure
	Water and electricity infrastructure	<ul style="list-style-type: none"> Semi-arid areas suffer from a lack of access to reliable water and electricity infrastructure
	Markets and business zones/centres	<ul style="list-style-type: none"> SMEs in semi-arid areas have access to local markets, but their access to national or international markets is limited due to inadequate road and transport infrastructure Trade corridors with neighbouring countries: Mauritania, Mali, Morocco, Republic of Guinea, Guinea-Bissau Cross-border markets (E.g.: Diaobe) Specific business zones/centres and industrial parks have been created to help support market activities of businesses, although most of these reside outside of semi-arid areas
	Access to inputs, irrigation and new technologies	<ul style="list-style-type: none"> Policies, programmes and projects in place (e.g. GOANA, PNIA, PRACAS) which are supposed to improve agricultural SMEs' access to inputs. However, these have had limited success due to: i) access and distribution systems; ii) high costs; iii) lack of transparency in the system at all levels; iv) average quality and trade with neighbouring countries Various organisations (e.g. ASPIT, Food Technology Institute (ITA), Technological development centre of the ADEPME, Centre for the Study and Research on Renewable Energy (CERER), Senegalese Incubator for Innovating Enterprises (INNODEV)) are helping enterprises access new technologies
	Public and key infrastructure incorporating climate change considerations	<ul style="list-style-type: none"> Public and key infrastructure fail to incorporate climate change impacts into their designs Seawalls have been built in Rufisque, Joal, Saly, and Poponguine National program on GHG emissions reduction through energy efficiency in the building sector. Project of production of thermal insulation materials based on Typha plant (<i>Typha domingensis</i>)

APPENDIX 2. APPLYING THE FRAMEWORK TO KENYA.

Influential factors	Key elements	Description
Institutional and governance arrangements	Climate change coordinating bodies/agencies at national and regional levels	<ul style="list-style-type: none"> • Ministry of Environment, Natural Resources and Regional Development Authorities (focal point for UNFCCC): <ul style="list-style-type: none"> ▪ National Climate Change Secretariat ▪ Directorate of Environment ▪ Kenya Meteorological Department ▪ National Environment Management Authority (national implementing entity for the Adaptation Fund) • Ministry of Planning and National Development – leading process to mainstream climate change into national development plans, including the Medium Term Expenditure Frameworks and Vision 2030 • Ministry of Finance and Treasury – responsible for allocation of funds from exchequer towards climate change activities • Ministry of Agriculture, Livestock and Fisheries – coordinates climate related issues across agricultural sector and responsible for implementation of various climate change programmes and projects • National Climate Change Council (to be established) – responsible to the Office of the President • National Drought Management Authority, within Ministry of Devolution and Planning – responsible for delivery of drought management and climate change adaptation policies and strategies in Kenya’s ASALs • Climate Change Units established in government ministries and departments • County governments - many have established climate change units and some have developed County Climate Change Fund Regulations/Bill
	National and/or regional agencies supporting private sector development, including private sector multipliers (e.g. private sector associations/entities, such as chambers and business associations)	<ul style="list-style-type: none"> • Ministry of Industry, Trade and Cooperatives – has developed several projects to promote SME development, including the Micro, Small and Medium Enterprises Competitiveness Project, as well as developed the Constituency Industrial Development Centres (CIDs) • Micro and Small Enterprise Authority within Ministry of Industry, Trade and Cooperatives – established for the promotion, development and regulation of micro and small enterprises • Kenya Industrial Estates Limited • Kenya National Chamber of Commerce and Industrialization – membership includes micro, small, medium and large enterprises; has developed programmes to support growth and development of SMEs. • Micro-Enterprises Support Programme Trust (MESPT) (2002) – promote growth, employment creation and poverty alleviation through support to enterprises. Aims to establish a strong, stable, market-based micro-finance sector. • Public Private Partnership (PPP) Unit in the Ministry of Finance and National Treasury – committed to improving and strengthening the environment for private sector participation • Kenya Livestock Marketing Council (2000) – promote livestock marketing, improve pastoralists’ livelihoods and reduce their vulnerability to weather and man-made disasters • Chambers of commerce at national and regional levels • KEPSA (Kenya Private Sector alliance) – very active in helping the private sector manage climate change risks and access opportunities • Kenya Association of Manufacturers (KAM) – started a project on removal of barriers to energy efficiency and conservation in SMEs
	Multi-stakeholder or Public-private partnerships (MSP/PPPs) to support climate change	<ul style="list-style-type: none"> • Kenya Private Sector Alliance (KEPSA): <ul style="list-style-type: none"> ▪ Represents all types of private sector, including SMEs. SMEs are members of KEPSA under an association of SMEs ▪ Helps the private sector manage climate change risks and access opportunities.

	adaptation decision making	<ul style="list-style-type: none"> ▪ Developed the Climate Business Information Network (CBIN) ▪ Actively engaged in the development of the NCCAP ▪ Undertakes assessments of climate change impacts on the private sector ▪ Produces 'Climate Change and Your Business' briefing note series ▪ Holds bi-annual talks with the Head of State under the Presidential Roundtables and every two months with Ministries under the Ministerial Stakeholder Forum
	Networks or consortia on climate change adaptation	<ul style="list-style-type: none"> • Climate Change Business Information Network (CBIN) • KEPSA
Regulatory/legal framework and policies	Climate change adaptation policies at national and regional levels	<p>Specific climate change policies:</p> <ul style="list-style-type: none"> • East African Community Climate Change Policy (EACCCP) (2011) and Climate Change Action Plan (CCAP 2013-2017) • National Climate Change Response Strategy (NCCRS) (2010) • National Climate Change Action Plan (NCCAP 2013-2017) • Draft National Climate Change Framework Policy (2014) • Kenya Climate Change Act (2016) • Kenya Climate Finance Policy 2015 – establishes the legal, institutional and reporting framework to access and manage climate finance, consistent with the institutional structures and framework set out in the Climate Change Act 2016. • Kenya's Intended Nationally Determined Contribution (INDC) • County Adaptation Funds • Draft National Adaptation Plan (NAP). <p>Other policies integrating climate change considerations:</p> <ul style="list-style-type: none"> • The Constitution of Kenya (2010) • Vision 2030 - recognises climate change as a key challenge to Kenya, the need to improve capacity for climate change adaptation and need to promote adaptation activities in high-risk disaster zones and ASALs • National Environment Policy (NEP) (2013) – proposes eight key actions on climate change, including developing and implementing awareness raising strategies and capacity development on opportunities for adaptation, strengthening early warning and response systems, putting in place a climate financing mechanism to fund climate change actions, and involving and empowering communities in adapting to climate change • Environmental Management and Coordination Act (EMCA 1999) • Energy Act (2006) and Energy Management Regulations (2012) • National Policy for Disaster Management (2009) • National food and Nutrition Security Policy (2011) – recognises the direct implications of climate change for food and nutrition security and proposes a set of climate change adaptation measures • Kenya Climate Smart Agriculture Framework Programme (KCSAFP) 2015-2030 – developed to set guidelines for implementing Climate Smart Agriculture approaches, strategies, practices and technologies • County Development Plans (CIDPs) – climate change adaptation mainstreamed into some CIDPs • National Policy for the Sustainable Development of Northern Kenya and other Arid Lands

	Building standards and/or codes incorporating climate change considerations	<ul style="list-style-type: none"> Kenya Climate Change Act (2016). The Act gives consideration to take into account the international standards and best practice. The Kenya Green Economy Strategy and Implementation Plan (GESIP). The strategy is meant to support development efforts towards addressing key challenges such as poverty, unemployment, inequality, environmental degradation, climate change and variability, infrastructure gaps and food insecurity. The Strategy for example enhances the enforcement of building codes while promoting green technologies in the construction industry. Environmental Management and Coordination Act (EMCA 1999). This Act provides almost all the standards for environment and climate change related matters such as: pollution, deforestation, waste management and emissions. The act also mentions the responsible body to enforce such standards and codes.
	Local zoning rules incorporating climate change considerations	<ul style="list-style-type: none"> County Development Plans (CIDPs) – each of the 47 counties has a development plan that outlines and prepares zoning plans for both urban centres and rural centres. NDMA. The Authority generates, consolidates and disseminates drought management and climate change adaptation information, and operates an efficient drought early warning system. It is responsible for mainstreaming drought risk reduction and climate adaptation into planning and this includes zoning plans to overcome drought and climate related challenges. It provides a participatory approach in setting out rules on zoning in the ASAL.
	Private sector development policies	<ul style="list-style-type: none"> Vision 2030 – emphasises private sector in its strategies across its six priority sectors and three pillars of economic, social and political governance; recognises importance of not just large corporations but also of SMEs and the informal sector. National Industrialization Policy Private Sector Development Strategy (2006-2010) – specifically notes that micro, small and medium enterprises are central to the link between private sector and poverty reduction Micro and Small Enterprise Act (2012) Special Economic Zones Act 2015
	Climate change considerations integrated into policies supporting development of private sector and/or SMEs	<ul style="list-style-type: none"> Vision 2030 – recognises climate change as a key challenge to Kenya, the need to improve capacity for climate change adaptation and need to promote adaptation activities in high-risk disaster zones and ASALs
Economic and Financial incentives	Government incentives promoting adaptation in private sector	<ul style="list-style-type: none"> The Kenya National Climate Change Action Plan mentions the use and availability of public resources such as finances as a tool to stimulate greater investment by the private sector through improving access to finance and helping overcome any existing barriers. These are provided by government led ministries inviting private sector participation through calls and request for proposals.
	Finance instruments and funds accessible to businesses and SMEs in particular	<ul style="list-style-type: none"> Several funds from banks, micro-finance institutions, cooperatives and international institutions: <ul style="list-style-type: none"> Public sector: e.g. Development Bank of Kenya, East African Development Bank, Eastern and Southern African Trade and Development Bank (PTA Bank), Industrial and Commercial Development Corporation, Industrial Development Bank, Cooperative Bank of Kenya, Kenya Commercial Bank, and Consolidated Bank. Private sector: e.g. African Banking Corporation, Bank of Baroda, Citibank, Commercial Bank of Africa and Equity Bank. International: International Finance Corporation (IFC), Europe-based Development Banks and Industrial Promotion Services. Microfinance: e.g. Kenya Women Finance Trust, Small and Micro-Enterprise Programme (SMEP) micro finance bank. Government directive requiring commercial banks to allocate 10% of their portfolio to agriculture Micro and Small Enterprise Fund set up in 2015, and aims to finance the promotion and development of MSEs, provide them with affordable and accessible credit, and finance research, development, innovation and the transfer of technology. However, it has not yet been operationalised. Kenya Commercial Bank Foundation launched in 2015 an interest free Ksh1billion revolving fund for livestock farmers in ASALs

	Climate and Adaptation Funds	<ul style="list-style-type: none"> • African Green Revolution Alliance’s (AGRA) Programme for Rural Outreach of Financial Innovations and Technologies (PROFIT) • International Climate Funds: <ul style="list-style-type: none"> ○ Special Climate Change Fund (SCCF) ○ Strategic Priority on Adaptation (SPA) fund from the Global Environment Facility ○ Adaptation Fund ○ Climate Investment Fund (includes Strategic Climate Fund and Green Climate Fund (which has a Private Sector Facility)) ○ Africa Climate Change Fund from the African Development Bank ○ EAC Climate Change Fund • Kenya Climate Fund • County level – Climate Adaptation Fund piloted in five arid and semi-arid counties (Isiolo, Kitui, Makueni, Garissa and Wajir)
	Insurance schemes	<ul style="list-style-type: none"> • Index Based Weather Insurance (IBWI) to small-scale farmers • Index based livestock insurance (IBLI) • Climate Innovation Centre (CIC) – provides crop insurance in partnership with the Cooperative Bank of Kenya • UAP Insurance – providing weather index-based micro insurance policy named ‘Kilimo Salama’ (“Safe Agriculture”) for small-scale farmers, which allows them to pay their insurance premium through their mobile phones • UAP Insurance – also provides Index Based Livestock Insurance (IBLI), in collaboration with International Livestock Research Institute (ILRI) and UK DfID Financial Sector Deepening • APA Insurance and Takaful insurance provide index based livestock insurance for pastoralists in ASALs • Risk Guarantee Schemes • Hunger safety net programmes (HSNP) and cash transfer programme by the Kenya government
Data and Information	Climate and hydrological observations, and early warning systems	<ul style="list-style-type: none"> • Kenya meteorological department (KMD) – mandate to collect and store climate data for Kenya. It has developed satellite derived data. <ul style="list-style-type: none"> ▪ Data accessible on request and also information dissemination. Has data of temperature and rainfall trends (mean and variability of rainfall, maximum and minimum temperature) ▪ Produces weather forecasts on different time scales (daily, 5-day, weekly, monthly and seasonal weather forecast) ▪ Downscaled climate models developed in collaboration with the University of Nairobi ▪ At county level, county director of meteorology provides downscaled weather forecast • Department of Resources Survey and Remote Sensing (DRSRS) (within the Ministry of Environment, Natural Resources and Regional Development Authorities) and the Climate Prediction and Application Centre (ICPAC) at the Intergovernmental Authority on Development (IGAD) also produce climate and hydrological observations and seasonal climate information products. • Ministry of Environment, Natural Resources and Regional Development Authorities has a dedicated website on NCCAP with information on key climate risks and impacts on sectors, and includes the Adaptation Technical Analysis Reports. • Early warning bulletins are produced for ASAL counties by the NDMA
	Seasonal weather forecasts	<ul style="list-style-type: none"> • Seasonal forecasts produced by KMD • Seasonal forecasts also produced by the DRSRS in collaboration with ICAPAC
	Climate change projections	<ul style="list-style-type: none"> • Kenya’s Second National Communication to the United Nations Framework Convention On Climate Change summarises climate change projections for Kenya

	Data and information on direct and indirect impacts of climate change	<ul style="list-style-type: none"> Ministry of Environment Natural Resources and Regional Development Authorities has a dedicated website on climate change action plan²² <ul style="list-style-type: none"> Provides evidence of key climate risks and impacts on sectors Includes Adaptation Technical Analysis Reports (ATAR) Kenya Agricultural and Livestock Research Organisation (KARLO) - Research and development on relationships between climate variability and change and agricultural crops and livestock production
	Information on or case studies of adaptation measures, costs and benefits	<ul style="list-style-type: none"> Kenya's INDC provides an overall estimate of total adaptation costs Third Technical Report 'Synthesis of costing information'²³ within the Government of Kenya's Adaptation Technical Analysis provides sectoral breakdown of cost estimates for sectors including agriculture and livestock, tourism, environment, health and infrastructure. Report also provides one case study of adaptation costs to a business
	Information on or case studies of community vulnerability, risk and adaptation	<ul style="list-style-type: none"> Kenya's National Climate Change Action Plan – technology needs assessment Kenya's Adaptation Technical Analysis Report (ATAR) Climate Change Vulnerability and Preparedness in Kenya²⁴ Global Water Initiative report on climate change vulnerability assessments in Garissa, Kenya²⁵
	Adaptation Decision support tools and toolkits, including standardised risk assessment tools for private sector	<ul style="list-style-type: none"> Kenya's National Climate Change Action Plan – lays out information on data collection and its requirements, climate data assessment and the use of tool kits through the different government bodies. These toolkits are full all users and therefore not specifically tailored to public or private sector actors.
Information and communication technologies	Information and communication technologies	<ul style="list-style-type: none"> Wide use of mobile phones in Kenya's semi-arid regions Limited use of internet in semi-arid regions Mobile phone applications that help farmers and businesses access insurance products and make claims SMS based platforms where businesses can get information on market prices and availability of agri-products Radio stations broadcast weather and agricultural information in local languages Community radio station set up to disseminate seasonal climate information 'county-wide' in local languages in Isiolo County Overall, use of ICTs to support private sector adaptation in semi-arid regions remains limited
	Websites/online portals on climate change adaptation	<ul style="list-style-type: none"> Kenya meteorological department website, radio and TV broadcast Downscaled weather forecasts available at county level on county websites Other climate change related websites run by NGOs, e.g Mbeguchoice
Knowledge, Capacity development and training	Climate change adaptation training courses or programmes targeted at the private sector	<ul style="list-style-type: none"> Universities offer climate change related courses – certificate, diplomas and degrees up to PhD No courses or training programmes focusing specifically on adaptation needs of private sector Priority action identified in Kenya's INDC is to enhance education, training, public awareness, public participation, public access to information on climate change adaptation across public and private sectors
	Research institutions or centres	<ul style="list-style-type: none"> The Institute for Climate Change and Adaptation, University of Nairobi²⁶ - Builds human capacity necessary to address the unique climate

²² <http://www.kccap.info/index.php>

²³ <http://www.kccap.info/phocadownload/final/SC3/TR3%20NCCAP%20Synthesis%20Costs.pdf>

²⁴ https://www.boell.de/sites/default/files/assets/boell.de/images/download_de/worldwide/Kenya_Climate_Change_Adaptation_Preparedness.pdf

²⁵ http://www.iisd.org/cristaltool/documents/IUCN_Kenya_Garissa_long.pdf

	engaged in climate change research/work	<p>change adaptation needs of vulnerable communities through teaching, action-oriented research, development of innovative technologies and community participation. Providing expert advice for national and regional policy formulation and implementation.</p> <ul style="list-style-type: none"> • Centre for Advanced Studies in Environmental Law and Policy (CASELAP): provides postgraduate education for advanced interdisciplinary research, teaching and outreach in environmental law, policy and diplomacy. • Kenya Agricultural and Livestock Research Organisation (KALRO) provides research and development on relationships between climate variability and change and agricultural crops and livestock production. • Kenya Industrial Research and Development Institute (KIRDI) – environmentally sound technologies R&D • Climate Innovation Centre (CIC)
	Forums/conferences on climate change	<ul style="list-style-type: none"> • Various conferences and workshops organised by both government and private sector partners working on climate change, e.g. the Kenya Climate Change Working Group organises and supports (knowledge-wise) private and development organisations in workshops related to climate change.
	Agricultural extension and training services	<ul style="list-style-type: none"> • Agricultural extension services and work is mainly tailored towards small scale farmers and pastoralists, however they will provide extension services and information to the private sector if asked by the private sector
	Training and technology development centres, as well as other service providers for businesses providing information, tools, training and financial support	<ul style="list-style-type: none"> • University of Nairobi's Institute for Climate Change and Adaptation: Building capacity for adaptation through teaching, action-oriented research, development of innovative technologies and community participation. • KALRO: They lead in the development of new technologies especially in the agricultural and livestock sectors. • There are several other training institutions and centres especially in the top universities. • The Kenya Climate Innovation Centre (KCIC) provides incubation, financing and awareness that empowers the private sector to deliver innovative climate change solutions
Infrastructure and Markets	Road infrastructure	<ul style="list-style-type: none"> • Semi-arid regions in Kenya suffer from insufficient and/or inadequate road, water, electricity and marketing infrastructure. • Need to climate proof infrastructure (energy, transport, buildings and ICT) identified as a priority adaptation action in Kenya's INDC
	Water and electricity infrastructure	<ul style="list-style-type: none"> • Semi-arid regions in Kenya suffer from insufficient and/or inadequate road, water, electricity and marketing infrastructure • Need to climate proof infrastructure (energy, transport, buildings and ICT) identified as a priority adaptation action in Kenya's INDC
	Markets and business zones/centres	<ul style="list-style-type: none"> • Export Processing Zones Authority (EPZA), established in 1990. Mandate is to promote and facilitate export oriented investments and to develop an enabling environment for such investments. EPZA is a State Corporation, under the Ministry of Industry, Trade and Cooperatives. • No processing zones for SMEs for meat for the local markets
	Access to inputs, irrigation and new technologies	<ul style="list-style-type: none"> • Kenya Agricultural and Livestock Research Institute (KALRO). KALRO makes new technologies in agricultural and livestock sectors known to and accessed to the recipients through extension services. • National Accelerated Agricultural Inputs Access Programme (NAAIP): Through the Ministry of Agriculture to address low farm productivity by offering targeted subsidy in form of technical inputs to resource poor farmers in order for them to increase yield and production to meet household food security and generate surpluses for increased household incomes. • Several other Inputs and credit facilities targeting smallholder farmers
	Public and key infrastructure incorporating climate change considerations	<ul style="list-style-type: none"> • National government has already taken some steps to climate proof physical and marketing infrastructure

²⁶ <http://icca.uonbi.ac.ke/>