TECHNICAL REPORT

DECENTRALIZED GOVERNANCE AND CLIMATE CHANGE ADAPTATION

A CASE STUDY ON MALI

January 2017
This document was produced for review by the United States Agency for International Development. It was prepared by the University of Arizona for the ATLAS Task Order.

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Cover Photo: Sahel Eco, June 2016. Farmers in Dianweli village, Konna Commune, plant millet using the zaï technique, which involves constructing pits to capture water and condense compost.

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Prepared for:

United States Agency for International Development

Climate Change Adaptation, Thought Leadership and Assessments (ATLAS)

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ACRONYMS

AEDD	*Agence de l'Environnement et du Développement Durable*
ANICT	*Agence Nationale d'Investissement pour les Collectivités Territoriales*
CFA	West African CFA franc
CMDT	*Compagnie Malienne de Développement Textile*
CPCV	*Coopérative des Producteurs du Coton et des Cultures Vivrières*
CRS	Catholic Relief Services
CVD	*Comite Villageois de Développement*
FMNR	Farmer-managed natural regeneration
FNACT	*Fonds National d'Appui aux Collectivités Territoriales*
GIZ	*Gesellschaft für Internationale Zusamenarbeit*
GOM	Government of Mali
MCCAA	Mali Climate Change Adaptation Activity
NGO	Nongovernmental organization
NTFP	Non-timber forest products
PDESC	*Plan de Développement Economique, Social et Culturel*
USAID	United States Agency for International Development

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The ability to exchange ideas and insights is critical to the advancement of research learning. We also want to thank the more than 40 participants from the Government of Mali, academia, donors and representatives of villages who participated in a public presentation or discussion.

Finally, we extend our warm and sincere gratitude to the inhabitants of the five participating communes, including their locally elected leaders and government representatives, for sharing their experiences and day-to-day realities with our field team. It is their reality that we seek to understand in this report, with the hope that our humble efforts will, at some point, have an impact on their ability to meet their goals and achieve their dreams.

EXECUTIVE SUMMARY

This study examines the ability of a decentralized governance system to address the pressures of climate change. Using the specific case of rural Mali, it asks the question: How does the Malian system of decentralized governance, instituted some 25 years ago, affect the ability of households and communities to adapt to a changing climate? The intent of the research is to identify the mechanisms through which localized governance can confer an adaptive advantage within the dynamic context of rural livelihoods. A specific goal of the study is to provide knowledge useful to the Mali Climate Change Adaptation Activity (MCCAA) and to United States Agency for International Development (USAID)/Mali climate change programming into the future.

The principal message of this study is that a decentralized structure of governance can play a key role in facilitating problem solving across villages and create important vertical linkages with external actors and resources. The realization of these potential benefits, however, is directly related to the quality of such governance. In Mali, decentralized governance has experienced significant challenges in achieving this adaptive advantage due to structural constraints. One challenge is that localized governance has created an arena in which the competition for political power takes precedence over development goals. Another challenge is that elected bodies are responsible for comprehensive development planning but often lack the technical and/or financial resources to adequately fulfill this mandate. In most cases, climate change adaptation is not specifically integrated into the planning process. Consequently, a development vision oriented to the adaptation needs of the population is not established. In response to these challenges, the study recommends actions for integrating climate change adaptation into the local development planning process and improving USAID efforts in this area.

METHODOLOGY

This study was based on qualitative research. Partly due to issues of security access, the target area was limited to three administrative regions in southern Mali: Mopti, Koulikoro and Sikasso. Five communes were sampled with the intent of capturing underlying agro-ecological and livelihood characteristics. Within each commune, three villages were selected to represent local variability. Sahel Eco, a local Malian nongovernmental organization (NGO), was contracted to conduct the fieldwork, which occurred over a period of six weeks during June and July 2016. At the village level, two focus group discussions were carried out, one with men and one with women. At least six household interviews were conducted to record individual experiences. At the commune level, key informants such as locally elected officials (*maire* and *conseil* members), local government administrators (*prefet* and *sous-prefet*), agriculture, livestock and forestry extension agents, school and health clinic staff, and local merchants were interviewed individually. In all, the field team completed 193 interviews and compiled more than 800 pages of responses. The field interviews were complemented by a review of secondary literature,

existing reports and a comparative analysis of the development plans (*Plan de Développement Economique, Social et Culturel*, or PDESC) of each commune.

After the draft report was completed and distributed for comments, it was formally presented to the USAID/Mali mission and then to a wider audience of stakeholders that included Government of Mali (GOM) policy makers and technical staff, MCCAA staff, donors and NGO representatives. In particular, the public event[1] generated insightful observations and suggestions that were integrated into the recommendations of the report.

FINDINGS

PERCEPTIONS OF CLIMATE CHANGE

The vast majority of households in the study area are dependent on rainfall for their livelihoods, predominantly a mix of farming and livestock activities. The interviews documented farmers' and herders' perceptions of changes in climate, which included the following:

- Overall reduction in the amount of precipitation
- Delayed onset of and shorter rainy season
- Unusual dry spells during the rainy season
- Excessive temperatures
- Increasing frequency of extreme winds

Herders particularly noted climate change as the cause of the reduced yield of natural rangelands and the disappearance of important grass species. Respondents also pointed to a relationship between climate change and anthropogenic activity such as rapid rates of deforestation, saying they believed the destruction of trees for charcoal, fuelwood and agricultural land was linked to the negative changes in rainfall regimes, excessive temperatures and high winds. Although this relationship is not supported by scientific evidence, their observations of reduced precipitation and increasing temperatures do correlate with historical climate data, which show a decrease from the mid-1960s to 2009 in average annual rainfall (12 percent) and a corresponding increase in average annual temperature (0.8°C).

ONGOING CLIMATE ADAPTATION

Traditionally, households in rural Mali have adjusted to changes in climate. For the purposes of this study, it is important to understand what adaptation strategies are evident now. During the research, households cited a range of strategies, including:

- Technology change, such as improved seed and water and soil conservation
- More confined management of herds
- Adoption of cash crops such as cotton and sesame
- Introduction of micro-irrigation on small plots for vegetable production
- Diversification into nonagricultural microenterprise activities such as small business,

1 The event was held on October 31, 2016, at the Centre Aoua Keita in Bamako. Forty-five people participated.

handicraft production, food processing, etc.
- Migration, both seasonal and semi-permanent

In the case of rainfed agriculture, farmers have widely adopted the use of short-season seed varieties to adjust to changes in the rainy season. These seeds have been introduced by NGOs, government technical staff and the parastatal cotton company. Farmers are well aware of the characteristics of each variety. Also, water harvesting and soil management techniques are used to capture and maximize available moisture. These include rock and earthen bunds, live hedges, planting pits and other structures that channel water to specific sites and into the soil. To combat declining soil fertility – seen as a consequence of climate and environmental change – farmers commonly incorporate manure and compost into their fields. Many use chemical fertilizers introduced by the cotton company.

LIVELIHOOD SYSTEMS IN RURAL MALI

The impacts of climate change are felt throughout livelihood systems, where households, particularly, are under continual pressure to decide how and when to use their scarce resources. Their decisions are made within an institutional context influenced by local governance. As such, an understanding of livelihoods is critical to analyzing the links between climate adaptation and local governance. Features of the five communes in this study include the following:

- **The predominant livelihood is mixed agriculture and livestock activities.**
- **Some households (e.g., Fulani) lean toward pastoralism, herding cattle, sheep and goats. They often move herds to seasonal pastures, even while maintaining some cultivated land.**
- **Others (e.g., Bambara) mainly farm crops, relying on rain for cultivation of staples such as sorghum, millet, rice and maize.**
- **Fishing is important for households (e.g., Bozo) along the Niger River and in wetlands.**
- **In three communes, cotton is an important cash crop.**
- **Women tend to grow peanuts and sesame and also produce other vegetables on small irrigated plots.**
- **Livelihoods are diverse: in additional to crop and livestock activities, households generate income through skilled labor (iron and leather working, masonry, carpentry, etc.), handicraft production, processing of local tree products, gold mining and unskilled day labor.**
- **Seasonal and long-term migration are common, with adult men frequently moving to urban centers in search of unskilled labor, sometimes traveling to neighboring countries or Europe.**

To adapt to changes in their environment, herders have reduced herd sizes and altered their composition toward small ruminants. Not only do they suffer the effects of poorer-quality rangeland, but traditional ranges closer to the villages have also increasingly been converted into cropland. Consequently, herds must be taken to more distant pastures in the highlands and plateaus. In addition, many households opt to put their cattle into the care of transhumant herding groups in exchange for milk and part of the calf production. It is common now for households to store cattle feed derived from crop residue gathered from the fields. In some cases, households have to purchase cattle feed from the market to sustain their animals through the dry season.

LOCAL-LEVEL ACTION ON CLIMATE CHANGE

In Mali, the major mechanism by which local governance can influence climate change adaptation is the local planning process.

The analysis indicates that the five-year development planning process that is key to commune-level management and administration is hampered by a lack of local technical expertise (and a reliance on outside consultants), a poor record of sustaining participation in the process and the lack of adequate funding to make the document a true planning tool. Furthermore, weak participation in development planning manifests an underlying process of political brokerage that often leads to the imbalanced distribution of public resources.

On the other hand, the mere presence of the institutions of governance at the commune and village level confers an adaptive advantage in the sense that it functions as an intermediary or gatekeeper through which information (on technology, government regulations and policies, etc.) and external resources can flow.

PDESC: A Channel for Action on Climate Change

The legislation that established the local government system in Mali also mandates a five-year development plan at the commune level. This document, the *Plan de Développement Economique, Social et Culturel*, or PDESC, is meant to be a cornerstone of participatory development. In the process of elaborating the plan, each village is contacted to conduct an assessment of village needs and priorities. The assessment results are then compiled for consideration at a multiple-day workshop, during which the elected council (*conseil*) members and other leaders decide upon the actions that will constitute the PDESC. After another round of consultations, the document is finalized and sent to the district (*cercle*) level for approval.

Public Engagement in the PDESC

While the law governing PDESC procedures mandates participatory planning, the study identified these areas of concern:

- Little technical capacity exists at the commune level to prepare a development strategy. Most communes contract specialized firms to prepare the document. This, in effect, isolates important parts of the process from the constituency, reducing participation.
- Of the five PDESCs reviewed, most appear to reflect a perfunctory preparation, with little evidence of a development vision, little assessment of the likely effectiveness of the proposed interventions and no review of the outcomes of the previous PDESC.
- In interviews, most respondents in the commune said they have little or no knowledge of the PDESC or its content. None said they had read it. Even the government staff who provide technical services related to agriculture, livestock and natural resource management have little knowledge of the plan.
- As there is no local-level source of revenue to fund projects in the PDESC, the plan functions more as a wish list of interventions. From the perspective of local leadership, it is a promotional brochure distributed to potential donors to attract their investments.

- In all but one commune, the PDESC has no specific focus on climate change adaptation.[2]

Contribution of Local Governance to Climate Adaptation

Localized governance is most effective when local institutions play a "brokering" function capable of increasing access to resources and information along both "horizontal" and "vertical" dimensions. In the horizontal dimension, institutions of governance create formal and informal linkages across villages that, in principle, enable larger-scale mechanisms capable of collective problem solving. At the commune level, local governance has the potential to 1) harness the traditions of shared decision making and collective action, and 2) open formal channels of information sharing across villages. This dynamic can facilitate the spread of new technology and broader awareness of climate change and its impacts.

The vertical dimension of governance links the commune to external actors at both the national and international, which increases the inflow of resources and information and connects commune-level adaptation strategies to the national and international climate change community. For example, soil and water management technologies were introduced to rural Mali through NGOs and government programs, and their adaptive value is widely accepted. Those communes with more effective governance institutions tend to be more successful in creating vertical partnerships and linkages that attract these adaptation resources.

Importantly, these two dimensions are mutually reinforcing: the more effectively participation operates horizontally, the more effective the external links become, and vice versa. Considering both dimensions, this study concludes that localized governance in Mali influences climate change adaptation in the following ways:

- **Perhaps ironically, the devolution of power to local-level institutions increased the role and influence of the central government at the local level.** First, decentralization transferred national party politics to the local level, since all commune members have a party affiliation, and the dominance of parties in local elections has national repercussions. Second, roles and responsibilities of locally elected bodies are extensively guided by national regulations. Third, the locally elected body has few financial and technical resources and is heavily dependent on government investment or donor/NGO project resources. In this way, decentralization provided an official voice to communes and, by extension, villages.
- **Despite the differing quality and detail across communes, the PDESC is a public document that formally registers the needs, priorities and resources of each commune in the nation. Even if few or no projects are actually funded, the PDESC gives each commune a public voice, as it were, in the national dialogue.** On the

2 The guidelines for PDESC preparation do not require a climate change adaptation focus, thus most do not have one. In the one commune (Konna) that does have a specific climate change focus in its PDESC, it was due to the influence of external agents (i.e., a donor-funded project).

other hand, this study clearly demonstrates that control over the allocation of resources through the PDESC is no guarantee of enhanced adaptation per se.

- **The effectiveness of the mayor (*mairie)* and local council (*conseil)* in promoting village collaboration and attracting external technical and financial resources simultaneously increases their capability to manage resources in ways that support adaptation to climate pressures.** The study concludes, however, that the desired effectiveness of local institutions is not achieved in many communes.
- **Effective decentralized governance has likely played a positive role in the wide diffusion of adaptation technologies, through a combination of horizontal participation and information sharing and linkages to the external actors who introduce the technologies.** A number of adaptation technologies are evident across villages and communes, some developed endogenously, some borrowed and improved, and some imported ready-made. For example, land management techniques, water harvesting, micro-irrigation and improved seed adoption are integrated into most livelihood systems.
- **In some communes, local governance has been effective in promoting institutional arrangements that favor climate change adaptation through improved natural resource management**. Even if compliance is uneven, government regulations on forest use – especially related to deforestation and charcoal production and land management related to bush fires – and on collective livestock corridors are well-known at the local level by residents, elected officials and technical services. The responsibility for compliance, dispute mediation and proactive environmental protection policies lies with the locally elected body. In some communes, the leadership has enforced the laws, created small reserves, promoted local reforestation, established livestock corridors and instituted local rules for collective natural resource management. These positive steps are interpreted as examples of the vertical mechanisms by which decentralization can advance climate change adaptation.
- **In some communes (e.g., Konna), the PDESC supports strategies for livelihood diversification.** For example, lands are set aside for female-managed garden plots, improved fishing infrastructure such as landing docks, and improvements in market facilities and transportation infrastructure.
- **Finally, effective governance at the commune level seems to mobilize more external resources, both governmental and nongovernmental.** With communal leadership acting as two-way brokers – horizontally across villages and vertically with government agencies, NGOs and donors – access to investment and technical resources appears to be greater. Examples from the study region include:
    - Catholic Relief Services (CRS) introduced and continues to promote women's gardening using micro-irrigation in Konna and Kléla.
    - Sahel Eco introduced agro-ecology interventions in Konna based on farmer-managed natural regeneration (FMNR) to improve soil fertility and increase agricultural production. It also works with women to develop their capacity for harvesting non-timber forest products (NTFP).

  These types of NGO-driven interventions have strong adaptation benefits and seem to have a greater probability of successful adoption where local governance institutions are

more effective. It is not possible to discern whether NGOs target communes already armed with more effective local governance performance or if the presence of an NGO enables an environment of improved governance.

Overall, evidence from the study indicates that most communes do not have the technical or financial resources to elaborate a development pathway sensitive to the increasing pressures of climate and environmental change. No widespread adaptation vision guides development planning; the PDESC tends to be much more pedestrian in its scope, focused on solving specific, concrete, short-term and immediate problems. The local presence of an active NGO, however, helps overcome the major resource and technical constraints to development planning and can make the PDESC a true guiding document rather than a simple wish list or marketing brochure.

RECOMMENDATIONS

To increase the potential contribution of decentralized local government to climate change adaptation, the following recommendations are offered. Each recommendation suggests concrete actions for specific development actors in Mali.

- *Coordinated national strategy*: Create within the donor community, and in partnership with the GOM, a national coordinated strategy to support preparation of adaptation-sensitive PDESCs. The strategy should include a role for NGOs, whose involvement helps enhance the quality of the PDESC and gives it credibility as a development plan that addresses the challenges of climate and environmental change. The strategy requires the full participation of the *Ministère de l'Administration Territoriale et des Collectivités* and its investment agency. Given that several donors and NGOs are already providing such support, a national strategy would ensure a coordinated and systematic approach.
- *Training and information sharing for local audiences*: Provide comprehensive orientation on climate change and the meaning of adaptation to all *conseil* members, technical services staff and village development committees (*Comité Villageois de Développement*, CVD). This could be a workshop series piloted in select communes, followed by creation of a network to facilitate regular information flow on adaptation options. The effort could be accompanied by an information blitz for the public on climate change causes, impacts and adaptation options using available media. This objective, strongly supported by stakeholders in the consultation phase of this study, would be implemented by the donor community in partnership with appropriate government services.
- *Revised PDESC procedures*: Adjust PDESC preparation to mandate integration of climate change adaptation as an organizational theme. The procedures might require the PDESC to include an assessment of the impacts of climate change on each village and livelihood sector, along with recommendations on specific adaptation strategies. This recommendation, also supported in the public discussion, requires GOM concurrence and support for action. Lessons might be drawn from existing models, such as in Konna, where NGOs assist in PDESC preparation.

- *Popularization of the PDESC*: Make the PDESC a “living document” by vigorously promoting it when it is disseminated to villages. It might also be translated into local languages. The goal is to have a continuously iterative process in which the document is discussed and systematically monitored. This recommendation also requires GOM concurrence and a revision of the existing guidelines.
- *Improved monitoring and evaluation of the PDESC*: Review outcomes of the prior PDESC. Although a formal structure of monitoring and evaluation is mandated for the *mairie* to ensure that the plan is put into action, there is no evidence that the prior five-year plan is systematically reviewed or that its lessons learned inform the preparation of its successor. Strategic development requires a longer vision than five years; continuity across planning activities will improve the effectiveness of the process. This recommendation is directed to the GOM and requires a revision of the guidelines to make this review mandatory.
- *Improved financial planning*: Redesign the financing of strategic development goals so that the adaptation elements of the PDESC have the financial support necessary to guarantee implementation. To develop a realistic planning instrument, the donor community should coordinate with GOM financing agencies (e.g., *Agence Nationale d’Investissement pour les Collectivités Territoriales*, ANICT) to identify the mechanisms that will support PDESC adaptation projects.

These recommendations cannot be operationalized at the commune or village level alone. As noted, some require changes in current policy and/or have significant resource implications, particularly the restructured financing of the strategic development plans. Collaborative partnerships between the GOM, donors, NGOs and locally elected bodies are necessary to address these recommendations. The future of climate change adaptation in Mali and elsewhere will depend on such collaboration.

For the USAID/Mali mission, these recommendations imply three concrete actions to support the role of governance in local-level climate change adaptation:

- First, the Mission is in a position to help organize a dialogue among GOM agencies (e.g., ANICT, *Agence de l’Environnement et du Développement Durable* –AEDD), donors, NGOs and private sector stakeholders. Its purpose could be to design a comprehensive strategy for introducing adaptation content into local-level development planning. This strategy would contain intervention content – similar to the climate-proofing approach undertaken by (GIZ) *Gesellschaft für Internationale Zusamenarbeit* – and targeting indicators.
- Second, the Mission could integrate into its existing programming an initiative for the orientation or education of local officials. This effort would go beyond enhancing public awareness of climate change to assisting locally elected officials to operationalize climate change components into local development planning.
- Third, the Mission could pilot climate change interventions in local-level development plans through the existing MCCAA, which is already working on PDESCs in selected villages.

Finally, the stakeholders brought together for the public discussion of this draft document

provided very useful feedback. They could be brought together again to form a sounding board (or even a formal advisory committee) for MCCAA and future activities.

1. INTRODUCTION: THE RESEARCH QUESTION

As the global community seeks to meet the challenges of a changing climate, recognition is rapidly expanding that the frontline of effective climate change adaptation is at the local community level. While it is true that some adaptation interventions will involve large-scale investments and infrastructure projects, the majority will center on local problem-solving strategies devised by communities. In the face of unprecedented patterns of climate variability, the breadth of challenges will likely exceed the abilities of households and communities to solve them. Multiple horizontal and vertical partnerships will be required, involving the state (government), nongovernmental organizations (NGOs) and broader civil society, local community-based institutions, international aid organizations and private sector enterprises. Even with such a multitude of actors and stakeholders, the ultimate configuration of climate change adaptation strategies and their implementation at the local level will be determined by the prevailing governance framework and its procedures for allocating resources and sharing decision-making authority.

RESEARCH QUESTION

Based on evidence from rural Mali, this study seeks to improve understanding of the complex relationships between governance and local-level adaptation to climate change and, to the extent possible, to draw conclusions about the efficacy of local-level planning tools as a vehicle for instigating adaptation. It focuses on rural communities where adaptation to climate change is underway. Within this context, the research evaluates the role of decentralization and the local-level institutions that provide the structure for power sharing and participatory decision making. The study describes the essential characteristics of local livelihoods, documents the nature of climate and environmental stressors upon these livelihoods, and analyzes past and current strategies of adaptation. It then shifts to the institutional structure and function of decentralization within these communities and seeks to identify the ways in which local-level governance contributes, or could contribute, to more resilient communities. The results of this inquiry are then presented in the form of policy recommendations.

In addition, this study recognizes the current efforts to enhance climate change adaptation in several regions of the country. Specifically, the USAID Mali Climate Change and Adaptation Activity (MCCAA) project is active in the region of Mopti with a focus on the role of improved governance institutions in addressing the pressures of climate variability and climate change. Other donors such as GIZ (*Gesellschaft für Internationale Zusamenarbeit*) and local NGOs are introducing climate-sensitive innovations at the commune and village level. This study is intended to inform these initiatives by providing evidence of the complex relationships between local governance and climate change adaptation.

2. CONTEXT

The overarching context for this study is that Mali is a very poor country with a predominantly rural population whose livelihood resilience is challenged by a highly variable and changing climate regime and the continued sustainability of its resource base. The rural population is exceedingly vulnerable to shocks and stressors and has poor access to public services and infrastructure. Households and communities find themselves under constant pressure to cope with and adapt to an unpredictable environment. Amid this reality, a relatively new system of decentralized governance is intended to create institutions of power that channel public resources and manage the framework for local-level problem solving and development.

DEVELOPMENT INDICATORS

Mali, a French colony until Independence in 1960, is one of the poorest countries in the world, ranking 179th on the Human Development Index. Table 1 captures key indicators.

Table 1. Socioeconomic indicators of Mali

Population (in millions)	15.8
Population growth (%)	3.6
Rural population (%)	73
Human Development Index ranking	0.419 (179th)
GNI (gross national income) per capita (2011 PPS$)	US$1,583
GDP (gross national product) growth (2015%)	7.2
Average years of schooling	8.4
Life expectancy at birth	58 years
Multidimensional Poverty Index (%)	45.6
Gender Development Index	0.778 (179th)

Source: Adapted from UNDP 2015.

LIVELIHOODS

The rural Malian economy is based on agriculture, livestock and, to a lesser extent, fishing. The Niger River flows from Guinea, looping though the center of the country, providing opportunities for irrigated agriculture, some recession agriculture and fishing. North of the river, rainfall is exceedingly scarce and livelihoods are limited to livestock herding and oasis agriculture. South of the river, in the central and southern regions of the country, rainfall is more abundant, ranging from 400 mm of annual precipitation toward the more northern zones, to 1000 mm near the

HOW THE TYPE OF GOVERNANCE SYSTEM IS RELEVANT TO ADAPTATION

Governance is variably defined as the set of institutional arrangements through which public decisions are made and public goods are distributed (Agrawal 2008) or the structures and processes by which power is shared (Lebel et al. 2006). Although adaptation is inherently local, an enabling framework of rules, regulations, mechanisms and institutions is necessary to allow for a shift from reactive responses to shocks and stressors towards the strategic and sustainable enhancement of system resilience (Adger, Arnell, &Tompkins 2005; Füssel 2007; Agrawal 2008).

In any society, multiple forms of governance options exist at multiple levels, where institutions, stakeholder participation and people's representation are configured differently. Some models of governance are highly hierarchical, with power concentrated centrally and resource decisions made, more or less, top-down. Other models are more horizontal, with power shared between the central (national) and local levels under agreed-upon rules and procedures, both formal and customary. This latter model promotes participation and respect for community-based priorities, varying sources of information and collective consensus. This type of governance is said to be:

- *Multi-layered*, **linking different types of actors**
- *Polycentric*, **linking different levels of decision making, and**
- *Deliberative*, **engaging different actors in negotiation.**

Academics, policy makers and others have increasingly focused on the link between models of governance and the success of adaptation efforts. There is a widely acknowledged need to build an evidence-based understanding of how power relationships, technology options and resource management shape the adaptation process (Pahl-Wostl 2009; Plummer and Armitage 2010; Ostrom 2009). Current studies suggest that participatory and collaborative forms of governance that share power and decision-making authority confer an adaptive advantage on households and communities facing climate and related environmental pressures. It is also argued that collaborative models of governance are more effective because outcomes are derived from 1) a more dynamic local-level problem-solving capacity because local knowledge and technical knowledge are equally valued, and 2) deliberations that are more equitable, inclusive and socially and environmentally just. Moreover, there is a general belief that participatory governance enables a more efficient and appropriate use of external resources, whether they be from government or donors.

Even so, the internal workings by which collaborative governance produces an adaptive advantage are not yet fully understood. To complement several important examples of adaptive governance (Plummer and Armitage 2010; Poteete and Ribot 2011), there is need to document how a more dispersed power-sharing structure, the negotiation of consensus among different stakeholders, and the prioritization of community-based needs assessments actually expands adaptive capacity and enhances community and household resilience under climate change.

Burkina Faso and Guinea borders. In these semi-arid zones, the predominant livelihoods are mixed farming and livestock based on the production of small grains (finger millet and sorghum) and corn, rice, beans (*Vigna* sp.), fonio (*Digitaria* sp.), sesame, peanuts, cotton and a wide range of garden vegetables.

The fortunes of Malian rural livelihoods are determined in large part by rainfall. Thus, climate variability and climate change are exposure factors that directly affect the vulnerability of rural

households and communities (USAID 2014a). The famines that devastated Mali during the 1960s and 70s are well-known, and the historic rainfall record in the southern regions suggests that average annual rainfall levels have decreased since 1960 (USAID 2014b; Diallo 2011). Climate change projections are uncertain with regard to rainfall (models range from -22 percent to +25 percent up to 2090), but the most likely scenario is a 0 to 11 percent decrease (USAID 2014a; Dutch Sustainability Unit 2015). With regard to average temperatures, projections indicate increased warming for all regions of Mali (1.8° to 5.9°C by 2090). These projections portend an increase in the vulnerability of rainfed farming in most southern regions.

Both livelihoods and climate are discussed in greater detail later in this document.

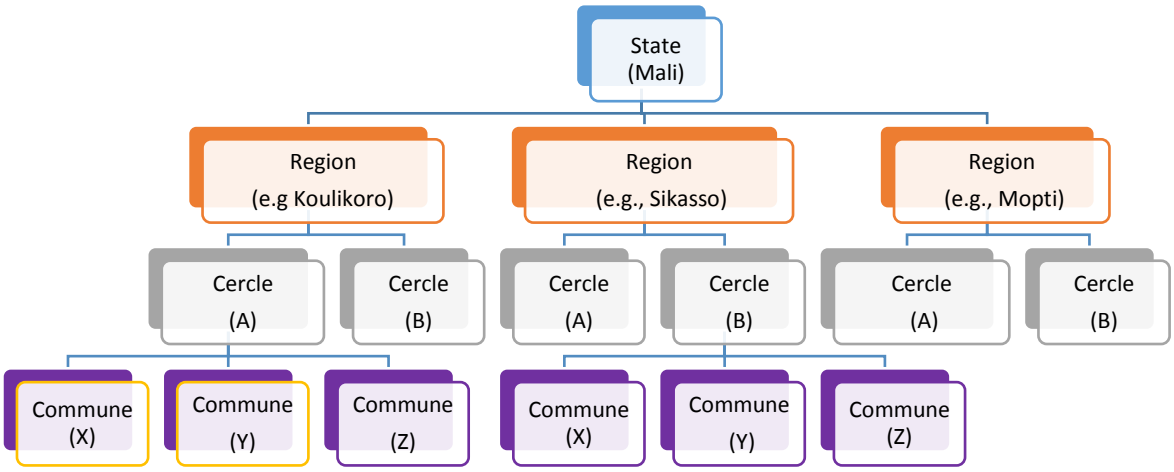
GOVERNANCE STRUCTURES

Brockhaus, Djoudi, and Kambire (2012) posit that the Sahelian countries are being challenged to create the framework for formulating, financing and implementing adaptation strategies in the context of an ongoing governance system based on decentralization. This is particularly true for Mali, which is nearly 30 years into a transformation of its political and governance system intended to institutionalize local-level control over decision making and resource allocation.

Decentralization began in Mali in 1991 as a rejection of the colonial structure of centralized government, which had vested no real power at the local level (Kelsey, Hughes, and Knox 2011). From the beginning, Malian decentralization was essentially a political project that reconfigured the institutional landscape and redistributed power to the newly established local politico-administrative units. This approach distinguished the system from initiatives elsewhere in West Africa, where decentralization was seen as a simple technical reform of territorial administration to meet the demands of donors (SNV and CEDELO 2004).

The 1992 Constitution pronounced the principles of decentralization while follow-up legislation of 1993 (Loi 93-003) created the general framework. Local task forces were set up to create the territorial units, define the regulations for territorial apportionment and build administrative capacity at the local level. Legislation in 1993 established the current structure consisting of "*régions*" (regions), "*cercles*" (districts) and "*communes*" (communes) as "*collectivités territoriales*" (territorial units) in rural areas, as depicted in Figure 1 (Kelsey et al. 2011). Currently Mali has 10 regions (plus Bamako), 49 *cercles* and 703 communes.

Figure 1. The decentralized politico-administrative structure in Mali



As indicated in Table 2, the elected bodies (*conseils*) and their executive components are the central retainers of local-level power and decision making, while the appointed government authorities are relegated to a more supervisory or advisory capacity.[3] Table 2 does not present the other "local" authority, which is vested in the traditional figure of the village chief and other local bodies such as the village development committees (*Comité Villageois de Développement*, CVD). These institutions mediate the distribution of customary land rights, settle conflicts related to land tenure, herder-farmer relations, etc., and interact with elected bodies.

3 According to legislation of 2012, the appointed government representatives are to provide assistance to the elected bodies and assure that all legal requirements are met. The Minister of *l'Administration Territoriale et des Collectivités Locales* oversees and assists the regional elected bodies, the *préfet* of the *cercle* oversees and assists the *cercle* elected body, and the *sous-préfet* oversees and assists the commune-level elected body.

Table 2. Political organization and functioning of local government in Mali

Description	Communes	*Cercles*	Regions
Number	703	49	10 + Bamako
Composition	Villages, Quartiers, Fractions	Communes	*Cercles*
Supervisory authority	Sub-Prefect	Prefect	High commissioner Governor of the region
Elected bodies	Communal Council ("*Conseil Communal*")	*Cercle* Council	Regional Council
Executive bodies	Mayor + Adjoints	President of the *cercles* Council + Vice-Presidents	Regional Council President + Vice-Presidents
Frequency of ordinary sessions	Quarterly	Quarterly	Quarterly
Length of ordinary sessions	5 days with 2 days of extension	5 days with 2 days of extension	5 days with 2 days of extension

Source: Adapted from SNV and CEDELO 2004 and Kabore et al. 2014.

3. METHODOLOGY: A QUALITATIVE STUDY

DATA COLLECTION AND ANALYSIS

This inquiry into the impact of decentralization on local-level climate change adaptation employed a qualitative methodology. Its intent was to achieve as detailed an account as possible of the rural reality as reflected in:

- Characteristics of the predominant local livelihoods
- Local perceptions of climate variability and change with associated environmental and socioeconomic impacts
- Household and community strategies of response to climate and environmental stressors and shocks
- Experience of decentralization as it is understood and operates at local level, and
- Current or potential impacts of this local governance on climate change adaptation.

LITERATURE REVIEW AND FIELD RESEARCH

Initial data were collected through an extensive literature review on decentralization and climate change adaptation in the region and Mali specifically. For primary data, the team developed qualitative data-gathering tools comprising focus group discussions, household interviews and key informant interviews. It was assumed that men and women would have differing versions of the local reality, but in rural Malian society, women are often reluctant to express their opinions in a public forum in front of men. Therefore, the focus groups were divided in two groups, one for men and one for women. As such groups often generate consensus outputs, this can cloak relevant differences in the experience of individual households. Thus, 6 to 10 household interviews (in the residence of the interviewee) were also conducted in each village for the purpose of characterizing individual households, perceptions and histories of environmental adaptation. In several cases, the household head was a woman.

Men's focus group discussion in Bouana village.

The key informant interview is designed to elicit the experience of individuals who have specialized knowledge of and experience with some dimension of the research question or who occupy a specialized position in local society. In the case of rural Mali, these individuals include: local government

representatives (*sous-préfet*, *préfet*), members of the elected council (*conseillers*) including its executive arm comprising the mayor (*maire*) and deputy mayors (*adjoint*), the technical service providers for agriculture, livestock, water and forestry, NGO project staff, educators, health care workers, religious leaders and local merchants.

The field research was carried out by a Malian team from the experienced and well-regarded NGO Sahel Eco, located in Bamako. The team, composed of seven researchers, moved from commune to commune, spending about one week at each research site. Topic outlines were prepared for each type of interview to guide the conversation and organize the notetaking and recording of interview information. At the end of an interviewing day, each researcher entered the interview notes into a text file following this topic outline. In all, 193 interviews (focus groups, household interviews and key informant interviews) were conducted, generating more than 800 pages of text. This dataset constitutes the principal empirical substance for the content of this report.

Women's focus group discussion in Tiessembougou village.

This large body of information was analyzed first by summarizing relevant text by key theme and creating a matrix structure in which it was possible to compare all the interviews by theme, village and commune. Following this approach, the analysis identified patterns of correlation across theme (e.g., how household characteristics determine participation in local governance) and the ranges of variability across households, villages and commune. The analysis also allowed comparison across gender.

PUBLIC CONSULTATION

Another important methodological aspect that strengthened the quality of the study and improved the relevance of its recommendations was the public consultation process. To make the study as participatory as possible and take into account the perspectives of other stakeholders/partners engaged on similar climate change topics in Mali, the study team organized a two-level process to present the findings and build upon the preliminary feedback and recommendations. First, the study was presented to the expert staff of the USAID Mission in Mali. Next, a full-day workshop was conducted in Bamako with NGOs, other donor organizations, and representatives of the Government of Mali (GOM) at various levels including villages.[4] The public workshop included a presentation of the findings in a way that 1) raised awareness of the issues and potential implications of decentralized governance for adaptation to climate change, and 2) improved understanding of constraints and opportunities for adaptation to climate change at the local level in Mali. This stakeholder consultation devoted considerable time to small group discussions on strategies for improving the role of local

4 The consultation took place at the Centre Aoua Keita, in Bamako on October 31, 2016, with 45 participants.

governance in relation to facilitating and strengthening the process, as well as efforts to adapt to climate change at the local level. The output of this workshop was summarized in a formal report prepared by Sahel Eco. Further information on this workshop is found in Annex C. Recommendations from the workshop are presented in Annex D.

Small group discussions at public workshop in Bamako, October 2016.

STUDY SITES

The study sampled five communes, as the commune is the key local-level political and administrative unit.[5] The sampled communes, Ourikéla, Kléla, Koula, Minidian and Konna, are located in three regions of southwest and southcentral Mali: Koulikoro, Sikasso and Mopti (Figure 2**Error! Reference source not found.**). This area consists of relatively flat plains punctuated by low-lying hills. The Niger River flows in a northeast direction through two of the study regions, along with semi-permanent tributaries that have water in the rainy season. As in the rest of the Sahel, the savannah forests are rapidly giving way to the expansion of agriculture and the demand for charcoal and fuelwood. The selection of communes was purposeful, intended to capture local-level variability in agro-ecological zone and predominant livelihood systems. With regard to rainfall, the communes receive an average of 500 to 1000 mm annually. The rainy season also fills some of the lower plain areas' dry lakes of varying sizes. Specifically:

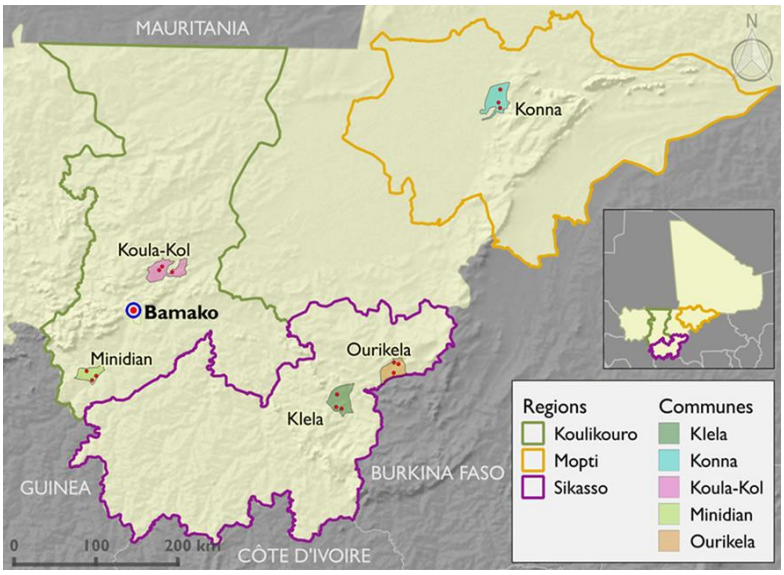
- *Ourikéla* has 582 square kilometers (km^2) and a population of 23,855 (2009). Its landscape is marked by rocky hills and extensive plains for cultivation, including lowland areas and semi-permanent streams and wetlands (*marigots*). The climate is Sahelian, characterized by a five-month rainy season (May to September) followed by a dry season. Temperatures in the winter months are cold but then climb to elevated levels prior to arrival of the rains. Over the last 10 years, average annual rainfall decreased; it no longer reaches 1200 mm, but varies between 800 and 1000 mm.
- *Kléla* covers 792 km^2 and has a population of 31,334 (2009). Its broad flatlands are punctuated with elevated plateaus of rocky soils. The plains are typical African savannah

5 Under the decentralization-enabling legislation, a region comprises lower level units called "cercles," and the cercle comprises communes. Communes have a varying number of villages, but the village does not have a formal elected body. See below.

vegetation with generally fertile soils. The climate of Kléla is Soudano-Sahelian, also with the locally recognized rainy and dry seasons. The commune of Kléla has access to the Lotio River and temporary water points *(points d'eau*) that occur in the rainy season. Here, too, annual rainfall levels have decreased to between 800 and 1000 mm.

- *Koula* has an area of 125 km^2 and a population of 17,953 (2009). It plains are broken by small hills and a low-lying plateau. The vegetation is typical of the African savannah, with its characteristic tree species (e.g., baobab, shea, African locust) dispersed over the flatlands. The climate has a pronounced rainy season and a dry winter season. Temperature varies from 16°C in winter to 40°C in summer. The commune has the Dlani River across its northern side and the Dlaba River to its western part. Three micro-dams (Bondo, Tombo and Siramassoni) allow for limited irrigated agriculture.
- *Minidian*, the southernmost of the five communes, has an area of 318 km^2 and a population of 20,461 (2009). It lies within the pre-Guinean ecozone and has significant areas of forest and bamboo. The north is dominated by the Mandingue plateau. In the south, a large plain accompanies the Niger River with lowlands that flood seasonally. The sandy, light soils at the base of Mandingue Mountain are appropriate for peanut production. The commune is fed by water from the Niger River and numerous semi-permanent water points. In a normal year, rainfall ranges from 800 to 1200 mm. The temperature ranges from 20°C to 30°C in the cool season and from 30°C to 40°C in the hot season.
- *Konna,* the northernmost of the five communes, has an area of 838 km^2 and a population of 49,966 (2016). Much of the commune is located within the Niger River Delta. The riparian lowlands flood seasonally. Numerous semi-permanent wetlands (*mares*, *marigots*) provide water for irrigation and animal consumption. The savannah vegetation, both woody and grassland, is highly diverse, with the Sassimba Forest located in Konna. The climate is Soudano-Sahelian. Total annual precipitation ranges between 250 mm and 450 mm, with a highly variable distribution over time and space. Temperatures vary from 20°C to 45°C within the year.

Figure 2. Location of study sites



Within each commune, three villages were selected, avoiding the large commune urban seat, and seeking to account for agro-ecological and livelihood diversity. Table 3 presents the population size of the villages included in the study, in terms of numbers of individuals (men and women) and of hamlets, concessions and households. As the table indicates, the villages vary

in population from around 400 to 4,000 residents and are located 2–15 km from the commune seat. However, the seemingly short distances are magnified by the poor quality of the road infrastructure, and most transportation between village and communal seat/market is by foot. In some villages, residential clusters in hamlets are located away from the principal village location; their residents are usually relatively recent arrivals to the village or those relying on herding as a source of livelihood.

Table 3. Sample of study sites, population of men and women, and distance to commune seat

Region	Commune	Village	Population size*	Number of concession/ household/hamlet	Distance to commune seat
KOULIKORO	KOULA	BOUANA	392 (188 M; 204 W)	C=26; HH=99	9 km
		TIESSEMBOUGOU	325 (178 M; 147 W)	Not available	12 km
		WOLONGOTOBA SOCORO	3160 (952 M; 1106 W)	C=103; HH=500; Hl=5	6 km
	MINIDIAN	BALANDOUGOU II	873 (445 M; 428 W)	Hl = 4	15 km
		DAMBALA	1379 (788 M; 591 W)	Not available	6 km
		KELA	2193 (1139 M; 1054 W)	Not available	6 km
MOPTI	KONNA	DIANWELI	817 (412 M; 405 W)	Not available	12 km
		KONZA BOZO	1706 (860 M; 846 W)	Not available	16 km
		SAMA	1573 (793 M; 780 W)	C=48; HH=240.	2 km
SIKASSO	OURIKELA	FARAKORO	2911 (1437 M; 1474 W)	Not available	2 km
		PALASSO	3711 (1832 M; 1879 W)	C=182; HH=254; Hl=47	7 km
		TIBY	2503 (1236 M; 1267 W)	C=139; HH=190; Hl=46	12 km
	KLÉLA	DOUGOUMOUSSO	1633	Not available	7 km
		LOUTANA	4171	C=142; HH=386; Hl=8	6 km
		ZERELANI	2503	Hl = 31	15 km

Note: * Estimation of 2009 general population census. C=Concession; HH=Household; Hl=hamlet; W=Women; M=Men.

4. LIVELIHOOD PATTERNS IN THE SELECTED COMMUNES

This study adopts the livelihoods framework as its analytical lens because climate change adaptation, at its essence, is evidenced by how communities and households modify their mobilization and allocation of resources. It can be said, equally, that the impacts of decentralized governance are ultimately measured in terms of access channels to the resources that define the different livelihood systems. Accordingly, this section describes the variation in livelihood patterns as a guide for determining how local governance does or could affect climate adaptation strategies. Significant differences exist in livelihood patterns across communes and, somewhat less markedly, within each of the five communes.

HUMAN CAPITAL

The demographic structure of the households across study sites suggests a similar household domestic cycle. The size of households interviewed in the study (N=102) varies from 2 to 18 members, with the larger families tending to be ones located in the village longer. In terms of demographic dynamics, men marry their first wives while in their early 20s, and newly established households grow quickly. Most marriages become polygamous, with each wife and her respective children living within the same compound. The typical age of household head is between 50 and 60 years, with the typical household having 8 to 10 members. The small number of female-headed households tend to be widows with children. Younger members of the household tend to have more access to education, while elderly adults are either unschooled or have limited years of primary education. In the rare household, members had attended or completed secondary level or had a degree beyond secondary school. The demographic patterns indicate that over time, households accumulate more members, who are allocated toward agricultural and nonagricultural labor activities. Thus, livelihood options appear to expand with increasing family size.

While all the study villages host multiple ethnic groups, they are usually dominated by one group or another. Commonly cited ethnic groups include the Bambara, Soninke, Fulani, Senoufu, Dogon, Miniankas, Malinke, Somono and Bozo. Traditionally, different ethnic groups are associated with specialized livelihoods; for example, the Fulani with livestock, the Somono with fishing and the Bambara with farming. Due to the pressures of change over centuries, however, most households combine farming and livestock and, where possible, fishing activities.

Intermarriage among ethnic groups is accepted and common in the local culture. At the same time, rural society is differentiated by a complex caste system that is hierarchically organized. For example, there are multiple elite noble castes, a warrior caste, and the lower-status occupational castes: singers or oral historians (*griot*), iron workers (*forgeron*), leather and hide workers (*cordonnier*) and others. Intermarriage between castes is forbidden; even when

different ethnic groups intermarry, it is at the same caste level. Such social stratification becomes important when local governance systems are analyzed.

NATURAL AND PHYSICAL CAPITAL

View of Niger River at Konza-Bozo with pirogues and pinasses for transporting people and goods.

As stated above, the relevant features of the environment in terms of livelihood strategies include the savannah plains, which are more or less sporadically forested with native tree species; low-lying hills and a plateau that serve as rangelands for livestock; and permanent or semi-permanent rivers and streams. It is important to add that land depressions occur in parts of the plains or near the rivers, allowing for the formation of ponds and lakes during the rainy season. Recession agriculture and gardening are commonly practiced in these areas. The permanent river systems and nearby water bodies are home to multiple fish species.

Water is a critical resource in this semi-arid environment, characterized by a single, relatively short rainy season (see discussion of climate below). In interviews, households indicated that they have multiple water sources that vary by season. Each source has different uses according to perceived quality. Seasonal standing water (e.g., *mare*) is used for animals' consumption or irrigation. Water from shallow, hand-dug wells (*puits*), which may or may not be cement-lined, is used for animals, washing and cooking, and, in some cases, for vegetable gardens. Most villages have a collective tube well (*forage*). Some villages have the desired water tower (*chateau d'eau*), which is fed by a tube well and distributed through pipes to collective faucets. Some households draw or channel water from a nearby river for domestic washing and irrigation.

With the vast majority of households in the study area engaged in farming and livestock, field interviews were designed to identify the basic household access to and management strategies for cropland and pastureland. The area of cultivated cropland ranges between 5 and 15 hectares (ha), and farm size tends to increase with the size of the household (and labor force). Customary tenure, the inheritance or attribution by the village or land chief, is the mechanism of access to cropland and allocation is mediated by the traditional figure of the village/land chief. Consistent patterns of cropping by gender exist across the communes. All farms produce staple grains such as finger millet, sorghum, rice and maize, which are valued as the critical food crops. Both men and women cultivate these crops but the provisioning of staple crops is the primary responsibility of men. Women traditionally grow peanuts, cowpeas and sesame, which are both for home consumption and for sale. According to local habit, men grow the cash row crops, such as cotton, rice, fonio (a grain) and soybeans, while women produce vegetables in irrigated gardens mostly for sale. While cultivated areas of grains, rice and cotton are relatively large, the amount of land for sesame and peanuts is small. Typically, only about one-quarter of

a hectare is allocated to irrigated vegetables, since they are mostly watered by hand.

While farm size tends to adjust to the size of the family and labor force, the introduction of cotton significantly expanded cultivated area throughout the study region. Cotton is grown under agreement with the state-owned cotton company (*Compagnie Malienne de Développement Textile* or CMDT), which provides seeds, inputs and technical assistance and is the sole buyer. Land allocated to cotton has not been taken away from other crops, but is additional land added to existing farms. And where in the past, labor availability might constrain the expansion of farmland, adoption of both animal and tractor mechanization for plowing and land preparation is widespread. In Kléla commune, for instance, the village of Zerelani has 5 tractors available for use by farmers and the village of Loutana, a major cotton-producing area, has 62 tractors.[6] In the focus groups, both men and women consistently stated that the amount of village land dedicated to farming has significantly increased.

Almost all households in the study communes raise livestock, usually cattle, sheep, goats, donkeys and poultry. The cattle and small ruminants are the most valued in the livelihood system, and some villages and ethnic groups maintain large herds. For the primarily agricultural households, the number of cattle ranges between 2 and 10 (with 2 usually reserved as draft animals for plowing), around 5 to 10 sheep and goats, a donkey and fewer than 20 chickens. For households inclined toward pastoralism, the cattle herd is usually larger than 30, with a small number of small ruminants and a few poultry.

Cotton field in Farakoro village, commune of Ourikéla.

In the past, animals grazed on grasslands nearby the villages, among the sparse savannah forests. Now, however, the encroachment of cropland has reduced the available rangeland and forced herds to more distant pastures and into the hilly regions. After grain harvests, livestock are also fed with stover and other crop residues from the fields. This source of feed has grown in importance. Many farmers now hand over their animals to pastoral ethnic groups such as the Fulani who engage in long-distance transhumance and agree to care for these “borrowed” animals in exchange for milk and some calves. This migration for pastures can trigger conflict between pastoralists and farmers when herds inadvertently damage farm crops because the rangeland “corridors” have been squeezed by the expansion of agriculture.

Forest resources constitute another important livelihood asset for households. Large gallery forests are not found in the savannah plains of the study area; rather, widely diverse tree species are distributed in clusters or even more sparsely over the landscape. Households exploit the trees for fuelwood for cooking, charcoal production for sale, building materials,

6 One large cotton producer has, by himself, six tractors and produced 70 tons of cotton last year, according to field interviews.

A woman husks néré fruits in the village of Farakoro. The yellow part of the fruit is consumed directly while nuts are made into a soumbala sauce often sold by women to pay their daily expenses.

livestock fodder and as a source of food. In the interviews, the most commonly cited species producing these non-timber forest products (NTFP) included the baobab, néré (African locust) and karité (shea), all of which produce useful fruits and leaves. Women process karité, for example, into shea butter, which is consumed at home and sold in local markets. The species *Faidherbia albida* (locally called "balazan") is a very widespread plant used as livestock feed. Other species are used to make domestic soap, which is also an income-generating activity.

While forest products are a key element of all livelihood systems, the rapid rate of deforestation is of great concern. The major determinants of forest degradation and clearing are fuelwood extraction, commercial charcoal production (an important income source for many families), the encroachment of farming, and traditional gold-mining activities. Each focus group and household interview decried the loss of trees due to human activity, and several villages have created small forest reserves managed by the residents. Deforestation is consistently associated with climate change, as discussed further in this report.

Households in the communes with access to the Niger River rely on fishing as an important complementary livelihood activity. For example, in Konza Bozo village (Konna commune), the Bozo, Somono and Marka ethnic groups fish the river from March to May (dry season) with traditional net technologies. Bozo women sell the fish fresh or processed into smoked or dried fish to merchants from the urban markets of Mopti, Segou and Bamako.

Fishing is an important contributor to livelihoods in some parts of the study area.

SOCIAL CAPITAL

The field interviews underlined the deep currents of social solidarity and collective action that are inculcated in the tradition of all these villages. The mobilization of this social capital is manifest in both the numerous types of associations and in traditions of labor sharing. The groups most frequently cited in the interviews can be classified into four types:

- Cultural groups whose purpose is essentially ritual or religious; e.g., mosque committee, rainy season dance group, hunters' group
- Social groups whose purpose is economic; e.g., diverse women's traditional savings groups, women's labor groups, seed banks
- Groups formally established by the CVDs; e.g., sanitation committee, school committee, tube well management committee
- Groups established by external agents working in the village; e.g., cotton and food crops cooperative, NGO-sponsored women microfinance groups

This tendency toward cooperative problem solving is bolstered by widespread labor sharing, village collective labor activities and the extensive sharing of food, money and inputs, especially in times of need for individual households. Based on the interviews, it is possible to conclude that the mere magnitude of collective action in every village would favor forms of climate change adaptation built on collaboration and cooperative action.

ECONOMIC CAPITAL

In general, the data depict a rural population that is cash-poor with modest levels of asset ownership. No formal banking institutions operate in the villages to support farming activities, though farmers can acquire seeds and other inputs for cotton on credit through the local cooperative and the CMDT agencies. For cash needs, village residents rely mostly on women's savings groups, which are de facto local lending institutions. Each village has multiple savings groups, differentiated by the weekly contribution charged to each member. The lower weekly investment (e.g., CFA 250, currently less than US$0.50) provides access to even the most cash-poor women, while other groups require a weekly contribution of CFA 1000 or more. The accumulated capital in the groups is then lent out to member households at a modest interest rate. Merchants interviewed in the commune seat villages also stated that during the lean season (*soudure*), they provide food and inputs on credit.

POLITICAL CAPITAL

Access to formal political power is a significant asset for villages, and this power is not equally distributed. Some villages are fortunate to have a representative on the communal *conseil* such as in Tiessembougou and Wologontoba Socora, whose elected representatives are, respectively, the first deputy mayor and *mayor* of Koula commune. The presence of such political representation at the communal level appears to confer an advantage to the villages in terms of project activity and number of community assets. The differential distribution of power among villages is a factor that affects the success of local governance and is discussed more below.

DIVERSIFICATION STRATEGIES

The most prominent livelihood strategy for these vulnerable households is diversification, which is documented in the allocation and management of farm and livestock resources, in income-

earning activities and in the export of labor in the form of seasonal and semi-permanent out-migration. (Annex A details these strategies by village.) The report already mentioned the long-term shift of purely farm and purely livestock livelihoods toward mixed farming-livestock systems. This has reduced transhumance routes, introduced the cattle "caretaker" strategy, made herders into farmers, changed the composition of herds toward more small ruminants and fewer cattle, and increased the reliance on crop residue and purchased feed.

Farm families traditionally diversified cropping patterns according to local soil type, planting peanuts, sesame and millet on sandier upland soils and sorghum, maize, rice and cotton on the moister, heavier soils. However, the introduction of cotton – and in some communes rice – has diversified farms toward cash crop production on a larger scale. The extensive cultivation of cotton in three of the study area communes (Ourikéla, Kléla and, somewhat less, Koula) is related to the strong presence of the CMDT. Although the labor requirements during harvest are high, cotton provides a source of cash that is valued by households.[7] This revenue helps the villages implement community projects and cover expenses for education, health and household items; however, farmers complained the company payments for cotton often come late and cannot help during the lean season. Another farming-related diversification strategy is the introduction of micro-irrigated vegetable plots, generally controlled by women. This gardening is normally done during the dry season on plots around 2500 m^2 irrigated by hand-dug wells or other water sources. The principal crops are tomato, onion, cabbage, eggplant, okra, potato, peas and tobacco, which are taken to surrounding markets or sold to intermediaries for export to further markets. This type of gardening is cited as an important income-earning activity for households.

In Dougoumoussou village, a woman begins to clear a field for her peanut crop.

Virtually all families reported some form of off-farm, nonagricultural income source. Most of these sources are climate-neutral; i.e., not directly affected by environmental conditions. These include: skilled trades (e.g., carpentry and bricklaying), bicycle and motorcycle repair, radio repair and, more recently, cell phone repair, as well as traditionally remunerated services such as healing and religious rituals (*maraboutism*). Women especially are engaged in what is called *petit commerce*, or small business activities, involving domestically produced items such as handicrafts, ornaments, foodstuffs (e.g., small cakes, shea butter) and locally grown spices or items that the women have purchased in greater volume elsewhere for resale. Another activity reported for both men and women is unskilled day

7 In the interviews, farmers identified an ancillary value of cotton production. As the CMDT facilitates access to fertilizers, farmers will in fact divide the available inputs among cotton fields and the cereal croplands. Also, in their rotation of crops, farmers see improved grain yields from the land previously planted in cotton due to residual fertilizer effects.

labor.

Two other income sources are based on extractive activities. These have had undesirable environmental impacts. One is extraction of fuelwood. All domestic cooking is done with fuelwood, but there is also an external market. Local production of charcoal for sale is also widespread. Interviewees did not indicate the size of these markets, except to say that they contribute to the worrisome rate of deforestation.

The harvest of trees for charcoal and firewood is a subsistence activity in villages.

The other extractive activity, mostly done by young men, is work in the gold-mining areas as either artisanal miners or laborers. Minidian commune has important gold-mining sites, especially in the villages of Balandougou II and Dambala, and young adults will spend the day extracting or processing at established mines and return home in the evening. Gold mining is so extensive that for some households it has become the primary livelihood activity, supplanting traditional livelihoods based on agriculture, fishing and livestock. At more distant gold-bearing sites, youth set up temporary residence and return home sporadically. The focus group discussions suggest that employment in gold mining and processing is an important income source for many households and is also leading to in-migration, with people coming from Guinea-Conakry and Burkina Faso in search of gold.

Land preparation in Palasso village. With many men migrating to other areas for employment, children sometimes help with crops.

The final and highly significant form of livelihood diversification is out-migration. Nearly 80 percent of the households interviewed have members who migrated or are currently away—in some cases, with multiple members absent. The most widespread form of migration is seasonal, and commune leaders lament that as soon as the annual harvest is complete, the young men are gone until the next agricultural campaign. These men mostly engage in unskilled work in Bamako, other regional urban centers and in Burkina Faso and Ivory Coast, returning with cash savings or domestic consumer items (e.g., clothes, shoes, soap). This pattern in most evident in Kléla, Ourikela and Konna. In Koula commune and the village of Kela in Minidian commune, the seasonal migration is to distant gold-mining sites, reducing the availability of labor for farming activities. Other forms of out-migration are semi-permanent, lasting more than a year or so.

These workers are effectively removed from the household labor pool, but, as a rule, they send home remittances that support the household both as investment capital and crisis relief. Some households indicated members as far away as France and Spain, which likely involves the hazardous migrant routes globally reported upon. In one village, the focus group mentioned a village association created in Spain by local migrants that which invests in projects back home.[8]

Overall, the livelihood systems in the study area are complex and diversified. With the exception of a small number of urban-based activities for merchants and service providers, all households base their livelihood strategies upon the production of food and livestock. Upon this base, households allocate their labor pool to diverse forms of income generation through their links to local markets and other more distant labor markets. In the face of environmental pressures, households can adjust by modifying and recombining their strategies of food and livestock production. For example, households can expand cropland into cash crops or integrate new technologies such as mechanization, or these households can modify the allocation of household labor by increasing out-migration. From this dynamic, it is possible to identify alternative adaptation options, as discussed later.

8 Association of Koula citizens living in the Spanish city of Toledo (A.K.E-TOLEDO).

5. CLIMATE CHANGE AND ITS IMPACTS

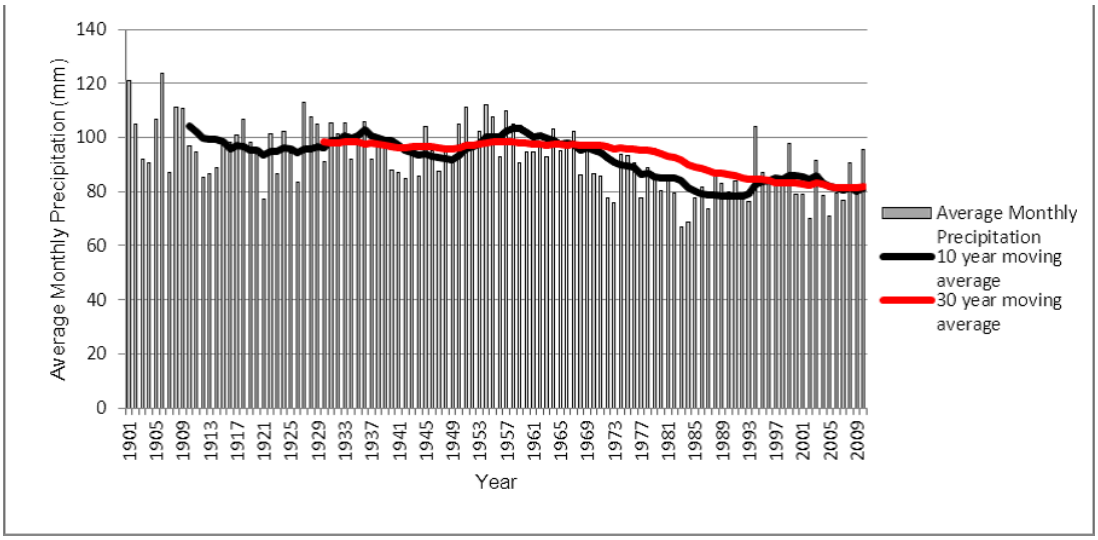
While climate change is a relatively new term in the vocabulary of rural Malians, the experience of change in the environment is well-known and a topic of considerable concern. In the field interviews, leaders, technical experts and residents were asked to describe their perceptions of climate change and its impacts upon local livelihoods. A high level of consistency emerged across communes and across interview sources. In general, village residents have a well-defined sense of the history of their respective villages and of significant events that shaped village identity. It is to be expected that these histories become narratives that bear a certain level of nostalgia for things past. Consistently across all the focus groups, participants shared a view that rural life was more predictable and the environment more “generous” in the times of one’s grandfathers. Forests were thick, grasses were high, many wild animals roamed the forests and plains, and rains were abundant.

The interviews also suggested a direct link, in the perception of residents, between the concept of climate change and the many forms of broader environmental change that are seen to be occurring. With regard to climate specifically, there is broad consensus that the length and onset of the rainy season have changed. Where rains traditionally arrived in May, they now are delayed until June or July; where the rainy season lasted up to six months, it now lasts for only four; where the rainfall was relatively abundant, it is now insufficient. This shift in the seasonal pattern of rainfall impacts crops whose production cycles last longer than the availability of moisture, especially the staple food crops (sorghum, millet, maize), rice and cotton.

The interviews further documented the perception that seasonal temperatures have increased significantly. Residents make frequent reference to temperature extremes (above 40°C) and to heat waves that engender higher rates of illness among man and beast. Along with extreme heat and reduced rainfall, people talk of unprecedented levels of wind damage and the frequency of severe storm events. While these specific perceptions of change are not always verifiable in the climate record, general historical trends lend credence to what local residents are experiencing.

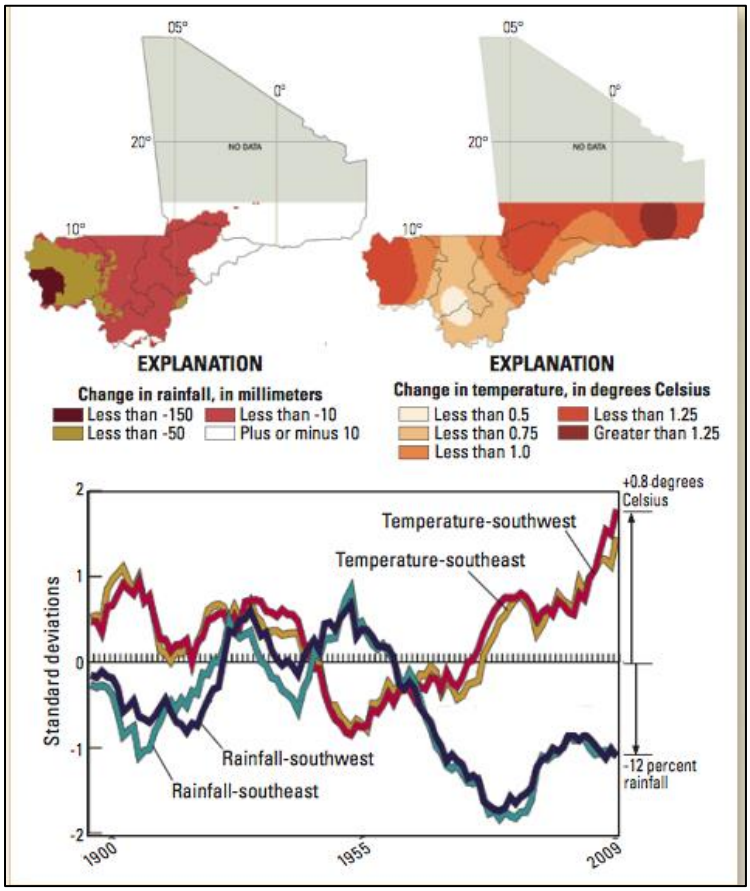
Figure 3 takes monthly rainfall averages (by year) for Mali as a whole and indicates that after the mid-1960s, average precipitation levels declined based on 30-year rolling averages. Figure 4 focuses on the southern region of Mali and compares average precipitation and temperature data from 1900 to 2009. The figure shows significant variation in rainfall over the period but since the 1960s a decline in average annual precipitation (12 percent less than the 1920-1969 mean). Temperatures increased by 0.8°C over this same period. While this report does not have historical data on such perceived changes as the onset and length of the rainy season, the trends in recorded temperature and precipitation are consistent with what rural people say they are experiencing.

Figure 3. Average monthly precipitation in Mali, 1901 – 2010



Source: USAID 2014b (p. 35).

Figure 4. Observed and projected change in June–September rainfall and temperature for 1960–2039 (top), with smoothed rainfall and air temperature time series for June– September for southwestern and southeastern Mali (bottom).



Source: Funk, C. et al. 2012.

The interviews yield other insights with regard to climate change. Farmers and technical staff agree upon the range of impacts associated with these climatic patterns of less rainfall, extreme temperatures, high winds and severe winter storms. The lack of consistent and predictable rainfall in combination with other factors such as lower soil fertility has reduced the yields of grains (sorghum, millet, rice and maize), which inserts a high degree of uncertainty into household food security. The strong winds are held responsible for destruction of crops in the fields, the falling of trees and soil erosion. The extreme storm events induce flooding in communes with low-lying areas and wetlands, which also results in soil erosion. Farmers also associate the excessive heat waves with the reduced rainfall and intraseasonal periods of drought. The interviews display an overriding concern with the overall reduction of soil fertility. In the minds of many, this tendency is directly related to the changes in climate.

The local explanatory models of climate change are also relevant to the study. The interviews consistently referred to anthropocentric causes for changes in wind, rain and temperature. Particularly, the rapid rate of deforestation is seen as the culprit for negative environmental change. The destruction of trees for fuelwood, building materials and charcoal reduces the physical barrier that impedes extreme wind velocity and lessens soil erosion, and the clearing of local vegetation for cropland is seen as inducing higher temperatures and less rainfall. This human hand in environmental change is further condemned when perceived as the work of outsiders (e.g., charcoal buyers) or of fellow villagers who did not heed existing environmental regulations. Therefore, local explanations of observed impacts point not only to climate change risks, but also to the prevalence of human-induced negative environmental changes, which reinforce each other.

Despite the recognition of an environment undergoing change, the concept of climate change per se remains vague in the perception of local residents, even among technical staff. The concept has been introduced to local villages by NGO workers and some government service providers, but there is little understanding of what climate change actually means. This seems to affect villagers' comprehension and sense of a climate change adaptation strategy, or, more germane, why it is important. Perhaps since these populations have traditionally adjusted to the climate variability of semi-arid Sahel, the nature of climate change risks and the magnitude of potential impacts are not yet assimilated into a collective narrative.

In terms of climate information services, residents are familiar with weather and climate information that arrives via radio and television or via the local agricultural agent. They also interpret a number of changes in plant and animal phenology as reliable indicators of the imminent arrival of the rains. Several villages carry out traditional animistic rituals to encourage a generous rainy season. In some field interviews, the national meteorological services (the "*météo*") were mentioned as a source of information, but the study did not uncover evidence of the use of their climate forecast advisories (USAID 2014b).

6. GOVERNANCE

The nature of decentralized governance in Mali is multidimensional and should be examined as such. This governance includes: a legal, institutional dimension, as briefly presented in Section 2 above; a political dimension that determines how participation and representation are effectively rationed; and a development dimension that determines how the governance structure is translated into change and actual improvements in the lives of rural citizens. The following discussion focuses on these latter two dimensions, based on analysis of the interview data and the secondary data provided by a comparison of the key development element, the *Plan de Développement Economique, Social et Culturel* (PDESC). The five communes' PDESCs were thoroughly analyzed and their content compared with the field interviews to establish how the preparation of this planning document effectively mapped out a comprehensive development strategy for the commune.

POLITICAL DIMENSIONS OF DECENTRALIZATION

Through the elected institutions presented in Section 2, it was the intent of decentralization in Mali to distribute to local communities the ability to participate in the public affairs of state, to devolve to the local level key forms of decision-making power, and to make development policy and national investment more sensitive to the needs of local constituents. In the reality of village life, however, this intent is often thwarted by a number of constraints inherent in the decentralized structure as well as in the process by which it is practiced.

With the introduction of elected bodies, it is expected that competition for power would emerge at the local level, especially since elected officials are formally members of national political parties and, thus, linked to the national political stage. And, indeed, the interviews contained frequent reference to incentives to maintain control over power by those so vested. The effort to concentrate and sustain electoral power is not always consistent with desired development outcomes, since resources are allocated according to political expediency rather than objective need. Furthermore, elected officials are not by virtue of their political success the most capable and experienced development managers – sustainable development often requires skill sets that elected officials do not necessarily have.

Another structural issue identified in the interviews is the ambiguous role of the legal local representative of the state, the *sous-préfet*. The responsibilities of promoting and managing development resources in the sectors of education, health and water and environment were formerly under the purview of the office of the *sous-préfet* (now called the *arrondissement*). As career administrators, most *sous-préfets* received formal training in administrative operations. Under the decentralized structure, however, the *conseil* and *mairie* have exclusive control over the policy making and management of these sectors. The *sous-préfet* assures the legality of decisions made by the *conseil* and verifies alignment and compliance with national development priority goals and policies. He/she is also in charge of security and judiciary affairs, and acts as a technical advisor to the *conseil* when called upon. According to the interviews, however, the

sous-préfet is generally ignored by the *maire* and the *conseil* since the position no longer retains any real power and influence. *Sous-préfets* resent the fact that elected leaders do not have the administrative experience or management capacity (in planning, implementation, monitoring and evaluation, etc.) to achieve the objectives envisioned by decentralized governance. This tension between the *sous-préfet* and the *maire/conseil* was uniformly documented across the five communes.

Finally, the number of *conseil* members, which varies across communes, is determined by the size of the commune, not the number of villages. For example, Konna has 22 members and 28 villages, while Kléla has 17 members and 14 villages. In the electoral system, candidates are not presented by village, so some villages in a commune do not have a representative on the *conseil* while other villages (or the commune urban center) have multiple members. As villages are close-knit social units with a strong sense of mutual sharing and responsibility, it is unlikely that a village without a representative would have the same level of access to scarce resources as a village with a *conseil* member. In fact, the focus groups suggested that villages with *conseil* representation enjoy a larger NGO and government presence. The study was not able to determine why one village is active in elections with greater participation while others are less so.

THE PDESC AS DEVELOPMENT GUIDELINE

PURPOSE AND PROCESS

The *conseil communal* is the elected institution responsible for development planning, implementation and evaluation, a process embodied in the elaboration of the PDESC. The five-year PDESC is mandated by law as the responsibility of the newly elected *conseil*, and in theory, its preparation follows a standard set of procedures in all communes. The process is designed to be highly participatory. Soon after the *conseil* is installed, it appoints a team of field outreach staff who are trained to visit each and every village and hamlet in the commune. During this visit, the team meets with the CVD and organizes a public assembly to which all residents are invited. The output of this visit is an assessment that documents the needs and priorities expressed by village members, including women, youth and all other existing social classes.

The individual village assessments are synthesized into a draft commune-level PDESC during a multiday workshop organized and managed by the *conseil* and technical staff. The general public does not participate in the deliberation of the final lists of priorities and projects, but the draft plan is formally presented during a series of public meetings at the village level. Based on this final public consultation, a committee is put together to prepare the final document. The completed PDESC is sent to the Prefecture (at the *cercle* level) for approval. Once approved, the plan is circulated among external donors (e.g., NGOs) and government agencies in an effort to attract financial and technical support (see Annex B for the elaboration steps of a PDESC).

CONTENT

In its final form, the contents of the PDESC include a basic description of the commune, a highly generic depiction of priority needs (e.g., reduce deforestation) and a list of proposed activities

that would constitute the five-year plan. The activities are classified into sectors under the control of the *conseil communal*: agriculture, livestock, water and environment, education, health, energy and infrastructure.

Table 4 compares the last PDESCs from the five communes and, in the case of Konna commune, analyzes two sequential plans (2009–14, 2016–21). The table lists the top priority projects proposed in each PDESC document for each sector and, where available, summarizes the estimated value of these interventions. At the bottom, a comparison is produced of the relative quality of the plans in terms of indicators such as clarity of presentation, level of documentation, preciseness of targeting, monitoring and evaluation strategy and fundraising strategy.

Based on this analysis, the following patterns emerged:

- *Agriculture*: The communes mostly proposed opening up cropland and, in some communes, irrigated land for vegetable cultivation. There was also mention of farmer training and farmer organization.
- *Livestock*: The proposed activities were to extend water sources for animals, establish livestock corridors to reduce potential conflict with farmers and improve animal health through vaccination campaigns and veterinary services.
- *Aquaculture*: All but one commune proposed projects to support aquaculture in ponds. Konna, on the Niger River, included a project valued at over CFA 1.6 billion (US$3.8 million) for rehabilitation of the docks used by fishing vessels.
- *Water and sanitation*: All PDESCs included water and sanitation projects, mostly the installation of tube wells and latrines.
- *Environment*: Proposed projects in all the communes focused on reducing deforestation, creating small forest reserves, some reforestation activities and enforcing the current forestry code. Only in Konna were the resources allocated for these projects of a significant level.
- *Energy*: Each commune planned investment in energy but only in the older Konna plan is solar power mentioned.
- *Health and education*: All PDESCs proposed significant investment in health and education, mostly restricted to construction of classrooms and health centers. The exception was Konna, where funds were sought for training of teachers and nurses.
- *Infrastructure*: All communes proposed projects to improve infrastructure, mostly for construction, rehabilitation or paving of roads including secondary roads between villages and feeder routes to the national road system.

In all, the estimated level of resources in the five PDESCs ranged from around US$500,000 in Koula and Kléla, to US$1 million in Minidian, to US$6 million and US$15 million for first and second Konna plans, respectively. It is important to note that only in Konna does it explicitly set an objective for reducing climate change impacts, specifically through interventions to reduce deforestation and raise public awareness.

WEAKNESSES OF THE DEVELOPMENT PLANNING PROCESS

Significant weaknesses in this development planning process were identified from the field interviews and the review of the PDESCs.

Uneven technical capacity

First, there is uneven technical capacity available to prepare a comprehensive plan that is based on past development performance, consistent in its development vision and able to be implemented. With little access to local technical experience locally – in fact, it is not uncommon for the *conseil* to have members who are illiterate – most communes contract an external consultant specialized in the elaboration of PDESCs to guide the process and generate the document. The consultant usually has limited knowledge of the local village reality, which can compromise effective participation and result in a document that is formulaic and mechanistic – hardly a consultative vision of a development path over the next five years.

In many cases, preparation of the PDESC is significantly influenced by the presence of NGOs or donors working in the commune who wish to emphasize or prioritize their specific agendas and areas of investment (e.g., forestry or irrigation). For example, the recent PDESC for Konna (through 2021) was elaborated with the assistance of a national NGO with financing from a larger World Bank project. The quality of the document clearly reflects this external input, but its content does not explicitly link to or build upon the priorities and projects of the preceding PDESC (through 2014).[9] Rather, the newer plan demonstrates a clear strategic shift in emphasis to natural resource management and sustainability.

Low level of village participation

A second concern is the low level of village participation not only in preparation of the PDESC but also in understanding of its content and implementation. The focus groups and household interviews clearly demonstrated that the majority of residents in the commune have little or no knowledge of the document. To be sure, the low level of literacy in all surveyed communities constitutes a strong constraint to effective participation but the problem is also due to the fact that the plan is not an “active,” openly discussed document. At best, some individuals declare that they have heard about the PDESC and some say it is related to projects, but virtually no one has read it, knows its content or has followed its implementation. Among women especially, there is little if any participation in the preparation or dissemination of the plan.

Even more worrisome, and related to the structural tensions described above, the government technical staff responsible for key sectors of agriculture, livestock and natural resource management for the most part do not participate in preparation of the PDESC, have little knowledge of its content and do not integrate it into the annual planning of their field outreach activities. In effect, the PDESC is not an effective plan of priorities and projects for which elected leaders are accountable. Rather in many communes and in most involved in this study, the PDESC is more the output of a mandated, perfunctory exercise conducted by a hired consultant or other outside actor, and is at best a wish list of projects with little relevance to the

9 This means that the 2016 document does not reference the previous one or note what was accomplished and what lessons learned could be derived from the process.

management of public affairs.

Systemic lack of financial support

The third flaw of the PDESC is the systemic lack of financial support for the plans. The PDESC planning process is regulated by the state and a budget is an obligatory component of the document. But public funding to implement the projects is inadequate, leaving the commune in the position of seeking external sources of support. The *conseil* and, specifically, the *maire*, are authorized to collect local taxes of differing types, such as “person-count” taxes on household members, buildings, cattle herds and carts, illegal land use fines and commercial fees charged to merchants.[10] According to the interviews, the taxes are unevenly collected and seldom paid, and an insignificant percentage of the total revenue goes to the PDESC.

The central government maintains a public investment fund to finance local PDESC priorities through the *Fonds National d’Appui aux Collectivités Territoriales* (FNACT), under the aegis of the ANICT (*Agence Nationale d’Investissement pour les Collectivités Territoriales*).[11] These resources are, however, markedly inadequate to meet local demand; they are also difficult to access and fraught with delays and inefficiencies. Thus, communes must market their plans to outside sources of financial support.[12] Indeed, in several interviews with *conseil* members, the PDESC was presented more as a promotional brochure whose purpose is to attract investment from potential donors and government agencies. According to the third deputy mayor of Minidian commune, “The PDESC is a good planning instrument for the achievement of the commune’s development goals in the sense that it is a guide for technical and financial partners for the implementation of their projects and programs, and it’s also a fundraising tool for the commune. But when the commune fails to raise funds for the implementation of actions planned in the PDESC, it becomes a burden."

OBSERVATIONS ON THE PDESC AND DEVELOPMENT PLANNING

In summary, the evidence suggests that under decentralized governance, power has been devolved to the commune level where it is contested in a political arena. The *mairie* and the *conseil* now manage and administer key sectors of the local economy, somewhat to the dismay of local representatives of the state, who have seen their responsibilities and influence significantly dwindle. The institutionalization of power in local hands, however, does not necessarily assure local autonomy in addressing village needs, allocating public resources and pursuing a development strategy. The field interviews raised questions about the effective participation of commune residents in development planning, for the vast majority of residents

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10 The *mairie* can also seek authorization to sell urban parcels of land for home building. This source of revenue has recently become a topic of heated debate.

11 The *Fonds National d’Appui aux Collectivités Territoriales* (FNACT) was created in 2007 to replace the *Centres de Conseil Communaux* (CCC), which was phased out in 2004. The FNACT is, in turn, under the aegis of the ANICT and focuses mainly on regional economic development by financing investments for regional *collectivités*.

12 In a report financed by USAID, Dickovick and Riedl (2010) demonstrate that local village traditions of pooling from individual household contributions do in fact provide the revenue for certain types of community development investments (e.g., in mosque construction).

have little understanding of the PDESCs and their content – even the government technical services in the relevant sectors work independently of this official development plan. The monitoring and evaluation systems are inconsistent and mostly ineffectual, and there is no systematic and objective assessment of the progress of plan implementation or of project impacts. Furthermore, the insufficiency of public funds makes the PDESC an unrealistic strategy for local development and allows political leaders to effectively ration available funds among different villages and stakeholders in ways that do not necessarily reflect priority needs.

The *Agence de l'Environnement et du Développement Durable* (AEDD) is the national agency responsible for climate change adaptation in Mali. AEDD has promoted introduction of "climate-proofing" into communal development programs through donor partnerships.[13] AEDD's reach, however, appears to be limited. As a result, a climate change adaptation perspective is not systematically integrated into the development planning of a commune unless an NGO or donor orchestrates it. In effect, some NGOs and donors do play a major role in the reformulation of the PDESC to make it "climate smart," as is the case with the second PDESC for Konna. As suggested below, the most promising pathway to introduce climate change action into the local governance system is likely to involve a concerted coordination of NGOs and the GOM in support of the local development planning process.

13 The most extensive effort has been carried out by GIZ in the southwestern regions of Mali (see GIZ 2011, 2012). This initiative was delayed during negotiations with AEDD and has now been approved to expand beyond the initial piloted communes to a broader scope.

Table 4. Comparison of the PDESCs of the five study communes

Commune	Koula	Kléla	Ourikéla	Minidian	Konna (2009)	Konna (2016)
No. villages	36	14 (3 hamlets)	10	11 (28 hamlets)	28	28
Agriculture	Reduce deforestation and bush fires, reforestation Build awareness of livestock regulations Provide technical assistance for commodity chains Promote use of organic fertilizers and seeds	Open 100 ha of farmland Train farmers	Open 500 ha of land Open 6 ha of vegetable gardens Organize farmers into cooperative	Open 1500 ha of land Purchase 5 tractors Open 22 ha of vegetable gardens	Open 185 ha of vegetable gardens including for women Cover 7500 m of irrigation channels Train farmers on composting Revitalize 10 farmers' organizations Extend training on seed selection to 8 additional farmers Construct and equip 3 seed silos Build 4 cereals banks	Open 500 ha of irrigated perimeters Cover 2000m of irrigation channels Install 8 irrigation motor pumps Manage agriculture-pastoralist conflicts via committees Train farmers for certified seed production Construct dikes and channels; revitalize and reinforce cereals banks
Value (CFA)	31,000,000	3,000,000*	N/A	76,000,000	832,900,000	3,159,500,000
Livestock and fisheries	Install wells and water points Maintain water pumps Reduce clearing of fields Establish livestock corridors Improve animal health	Establish a site for butchery activities Install modern fish ponds Support poultry operations	Construct 3 sites for animal vaccinations Construct 60 km of pastoral corridors Construct animal water points Construct fishing ponds	Construct and equip 4 (ponds) livestock watering sites Construct fishing ponds	Construct and equip 6 livestock vaccination sites; rehabilitate 4 rain gutters Create 5 consultation frameworks to prevent agriculture and pastoralist conflicts Construct 9 fishing ponds Improve skills of fishermen	Construct livestock water points (wells) Facilitate pastoralist access to livestock fodder with 50% subsidy Install a consultation/ management committee for pastures Build vaccination sites Finance cattle-fattening activities Rehabilitate the landing stage of boats Provide technical training of

Commune	Koula	Kléla	Ourikéla	Minidian	Konna (2009)	Konna (2016)
						fishermen Organize fishermen in cooperatives Increase fisheries equipment Settle fishing ponds and floating cages
Value (CFA)	24,000,000	11,800,000	N/A	13,000,000	72,000,000	2,139,650,000
Water/ sanitation	Ensure access to potable water Install latrines	Install 5 tube wells; repair tube wells Extend public water pipes	Repair and maintain 13 water pumps Provide water conveyance with tube wells	Install 5 manually operated tube wells Install 2 mini-water conveyance infrastructures Construct water tower and extend public water pipes	Construct 11 large diameter wells, 5 new tube wells and other water points Rehabilitate 6 tube wells, 1 traditional well Promote integrated water management	Rehabilitate 17 different kinds of nonfunctioning water points Build 7 new water infrastructures Provide 3 water conveyance technologies Reinforce the water management committee
Value (CFA)	9,000,000	40,500,000	N/A	125,000,000	276,500,000	270,250,000
Environment	Reduce	Reforest 7 ha	Reforest 5 ha	Develop the	Reforest 810 ha;	Conduct awareness

Commune	Koula	Kléla	Ourikéla	Minidian	Konna (2009)	Konna (2016)
	deforestation and poaching Reduce solid waste pollution (plastic) Enforce forest regulations Establish surveillance committees for forests	Set up a forest reserve	Protect sacred woodlands Promote fodder crops	commune planning and zoning document	restore 4 ha of forests Rehabilitate an arboretum Settle lake's banks Dredge the lake	campaigns activities on deforestation Plant 1,000 trees/year Protect Sassimba Forest Enforce forest regulations
Value (CFA)	2,500,000	4,400,000	N/A	Budget not available	525,400,000	18 400,000
Education	Restore and maintain classrooms Hire teachers Support school management committee	Construct and equip 8 classrooms Construct literacy center Provide fencing for schools	Construct new schools and classrooms	Provide school supplies and equipment	Construct and equip 5 new schools Build fences for 2 schools Construct and equip 6 classrooms Construct and equip a kindergarten Hire new teachers	Construct 2 new schools, 15 classrooms; 7 madrassas Electrify 25 classrooms Build 5 school fences Endow schools with equipment and school materials Provide soft interventions in education
Value (CFA)	6,200,000	103,000,000	N/A	16,000,000	269,900,000	464,510,000
Health	Construct new health center Maintain old center	Construct and equip 4 health clinics with maternity ward	Construct and equip health care centers	Build the fence of the health care center in Kangaba Construct and equip a	Construct and equip 2 health care centers Construct and equip 1 nurses' office	Construct a new building for the health center Endow 3 health centers with equipment, drugs,

Commune	Koula	Kléla	Ourikéla	Minidian	Konna (2009)	Konna (2016)
		Equip 2 health clinics with maternity ward Provide fencing for health care center		new health care center in Kela Equip Kangaba health care center	Build a fence for 1 health care center Train 20 heath workers and retrain 33 others in maternal and child health Conduct WASH interventions including construction of gutters, public and private pit latrines, sumps	other logistic materials Provide health care coverage for vulnerable people Revitalize health center management committees
Value (CFA)	26,000,000	69,000,000	N/A	28,500,000	468,980,000	228,750,000
Energy	Identifies objective of diversifying energy sources, but no specific actions included	Not mentioned	Install a power generator for the commune	Not mentioned	Provide electricity to 3 villages using solar plant	Extend the grid for 56 km Undertake rural electrification
Value (CFA)					300,000,000	150,000,000 *
Infrastructure	Resurface main road Build bridges Construct public building Improve infrastructure of the commune seat	Secondary rural roads Build a new town hall Provide communication infrastructure (IT)	Construct rural roads	Rehabilitate livestock corridors Construct slaughter facilities Install marketplace Construct 6 classrooms and refurbish 10 Provide bridge maintenance (3); road resurface, dock for boats	Construct and equip the town hall building Settle 5 ha of land for housing estate Surface 1.43 km of roads with asphalt Pave 1.5 km of roads Settle 6 secondary roads	Conduct urban planning (zoning plan) Rehabilitate youth center Construct rural secondary roads Construct bridges Construct public and private pit latrines, sumps, gutters
Value (CFA)	4,000,000	> 25,000,000*	N/A	242,000,000 *	198,000,000	1,077,300,000
Total (CFA)	269,620,000	309,700,000	N/A	504,500,000	3, 233,880,000	7,927,560,000

Commune	Koula	Kléla	Ourikéla	Minidian	Konna (2009)	Konna (2016)
Comparative Assessment of the PDESCs of the five study communes						
Presentation Quality	LOW	GOOD	GOOD	VERY CLEAR	VERY CLEAR	VERY CLEAR
Documentation of the process	Too general	Little detail	Little detail	Very detailed with evidence in annex	Very detailed with evidence in annex	Very detailed with evidence in annex
Breakdown of the intervention in terms of village beneficiaries	NO	YES	N/A	YES	YES	YES
M&E structure	NONE	VAGUE	N/A	YES	VAGUE	VAGUE
Fundraising strategy	NONE	GENERAL	N/A	YES	NO	YES

7. EVIDENCE OF ONGOING CLIMATE CHANGE ADAPTATION

The field interviews clearly revealed that climate adaptation has always been part of the livelihood practices of individual households and communities in the study area. Given that these livelihood systems have demonstrated resilience in the face of past environment change, the relevant question is whether future pressures will exceed current adaptation limits. This section describes the adaptive practices identified in the interviews to better assess how decentralization has contributed or could potentially contribute to enhanced resilience.

SHORT-TERM COPING STRATEGIES

The fruit of shea trees is consumed during periods of food stress. Women process its nuts into shea butter for sale and consumption, while leaves and bark are used for traditional medicine.

It is important to acknowledge that long-term adaptation to environment pressures requires that households and communities are able to withstand short-term crises; that is, that the level of short-term absorptive capacity is adequate to the task. The field interviews documented the short-term coping strategies of households as they encounter and respond to shocks. Alongside the seasonal shortages of food (or *soudure)* that occur during the rainy season before the harvest of new crops, specific shocks include episodes of drought and flood that stand out in the collective memory. The household interviews confirmed what is known more broadly about seasonal food insecurity throughout the Sahel. To meet consumption needs, households shift their diets from the dwindling supplies in the granaries to available savannah products, both those that are processed (e.g., shea, néré) and those nuts and leaves prepared and eaten directly (e.g., baobab, wild grape, *Balanites aegyptiaca*).

A second coping strategy reinforces the advantages of mixed agriculture-livestock livelihoods, since many households sell part of their herd, usually a sheep or goat, to purchase food supplies. Women stated that revenues from their small business activities and from the sale of irrigated garden products (onions, cucumbers, peppers, eggplant, okra, etc.) allow their households to overcome short-term shortages. Households commonly spoke of engaging in day

labor on the farms of others in exchange for cash or food.

Another coping strategy helps explain the prevalence of women's savings groups in every village, since in times of scarcity, loans become an important option.

Finally, it appears that social capital provides a fallback strategy; many households talked of sharing food (and cash) with neighbors and relatives. While these coping strategies should be seen as well-tested responses to an immediate crisis, their value has a relatively short use-life. Repeated droughts and floods or more severe seasonal crises would soon reduce the effectiveness of these strategies and delay the transition of households back to normal conditions.

In times of food scarcity, the liana tree's fruit is consumed directly or made into jam and juice.

LONG-TERM ADAPTATION

Over the longer run, households and communities have made more significant adjustments to their livelihoods in the face of climate pressures. While some adaptive practices were introduced by external actors and others emerged from endogenous trial and error, they demonstrate the ability of households to modify and transform their livelihoods as environmental conditions so dictate.

AGRICULTURE

Farmers face an environment of highly variable rainfall, delayed onset of the rainy season with a shorter duration, excessive temperatures and high winds. In effect, less overall moisture is available for their crops, and it is unevenly distributed throughout the plant cycle. The field interviews indicated that a vast majority of farmers have introduced improved seeds and water and soil management practices.

Farmers are very knowledgeable of available seed varieties and their characteristics, though actual use depends on accessibility and affordability. In combination with a change

Groves of trees protect village vegetation.

of the agricultural calendar (mainly the sowing/planting period), short-cycle varieties of corn, sorghum, millet, rice, beans and cotton are commonly used to counteract the impact of a shortened or late-starting rainy season.[14]

Contour plowing of a cotton field in Loutana village.

With regard to water management, a number of water-harvesting techniques are commonplace, including stone and earthen bunds, dikes, live hedges of *Jatropha curcas* and zaï pits to collect rainfall in the fields. Some farmers also cited the use of tractors for contour plowing. The extent and sophistication of these practices demonstrate a well-developed awareness of the need to maximize available moisture and direct it to specific production sites. In Konna and Minidian, proximity to a major water source allows irrigation of rice plots, but across all the communes, small-scale irrigation has been adopted to promote vegetable production.

A major concern of farmers is declining soil fertility and the concomitant drop in crop yields. In part, farmers and farm extension officers recognize that the growing population and the expansion of cultivated area, especially in cotton, have significantly reduced the practice of fallowing fields, a traditional means of maintaining fertility. Some farmers rotate crops in the same field but the major soil management practices are the application of organic fertilizers (e.g., manure), the production and application of compost and, in the case of cash crops, the use of chemical fertilizers. These organic and chemical inputs were introduced by CMDT and NGOs working in the villages.

An area of Palasso village farmed for vegetables for market, or *maraicher*, during the winter. The same space is used for other crops during the dry season.

Soil fertility is also related to wind and water erosion. To reduce the damage of high winds, many farmers stated that they plant trees around their fields to protect their crops and break the wind velocity. Some use economically valuable species, such as mango, eucalyptus and cashew, either in the form of orchards or as windbreaks, to reap the benefits of fruit production as well as wind protection. Other farmers also adopt the practice of allowing natural regeneration of trees on their farms. On lowland fields where flooding causes water

14 It should be noted that short-cycle varieties are not as productive as longer-cycle ones. In a generous rainy season, farmers will produce less with the short-cycle seeds. It is thus a question of long-term risk management.

erosion, farmers construct runoff channels to move water away from cultivated areas.

LIVESTOCK

The main climate impacts on herding livelihoods are perceived to be the reduction in rangeland quality, the disappearance of valuable forage species, the drying up of once-reliable water points (the semi-permanent *mares* and *marigots*) and the lower water table in traditional wells. Again, these environmental impacts are compounded by the advance of cropland into traditional pasture areas, deforestation, burning practices for field management (including uncontrolled bush fires) and the disappearance of corridors for livestock passage, which engenders conflict between herders and farmers.

Since most farmers also have cattle, these issues are highly complex, and several adaptation measures have been adopted over the years. Traditional herders such as the Fulani practiced transhumance between dry season pastures and rainy season rangeland; this practice is still in place, though most pastoralists now add some rainy season agriculture. The interviews suggested that transhumant herds are smaller and their range of distance reduced. For more sedentary households, the opposite is true: as local grazing lands become scarce and degraded, these households are forced to send their animals to more distant pastures. Households with small numbers of cattle entrust their animals to specialized shepherds, usually from traditional herder ethnic groups, to take them to these pastures during the rainy season. Some households claim that they have sharply reduced the number of cattle and shifted toward sheep and goats, which can be managed locally.

Live fence around a maize field in Tiby village, commune of Ourikéla.

The most oft-cited adaptive practice for livestock is the stockpiling of animal feed from crop residues. Sorghum and millet stalks, corn stalks and husks, and bean straw, as well as any spontaneous grasses found among the crops are stored as feed to get animals through the dry season. Since these sources tend to be limited, the tendency is to reduce the number of animals and to favor small ruminants. Some herders stated that they also purchase feed from the market (e.g., hay, alfalfa pellets and cotton seed cake).

To address the scarcity of water, the most common responses included digging more wells, capturing rainwater into small reservoirs and soliciting public investment in a tube well. In a sense, these changes reduce the household herd size but they also represent a form of intensification in animal management practices, such as confined feeding. In some communes, such as Minidian, the more intensive treatment of animals is also associated with a shift in breeds toward improved milk-producing cows, which stay close to the household.

FORESTS

There is a widespread perception among villagers of a causal relationship between deforestation and broader environmental change, including climate patterns. The field data revealed some instances in which individual households took the initiative to create small reforestation reserves and to prohibit tree cutting on land they control. At the community level, the commune can also establish collective reserves and promote tree replanting but from the research this appears to occur on a limited scale. Legal regulations regarding the use of forestlands and rangelands are meant to promote sustainable management practices and limit the destruction due to fuelwood harvesting and charcoal; several communes expressed the need to enforce that legislation. It appears, however, that such efforts are often sacrificed to the powerful interests that exploit these forest products.

INCOME

As described in Section 4, households have adopted livelihood strategies that allocate their labor pool into a range of revenue-generating sources that are mostly climate-neutral, such as seasonal migration and microenterprise activities, including small business, garden produce sales, handicrafts, and others. The ability of these activities to increase the adaptive capacity of households varies widely. A village can only support so many cell phone repair or bicycle repair shops; the demand for handicrafts, homemade sweets and hair products is similarly limited. On the other hand, out-migration ties the village's fortunes to much larger and dynamic economies, and remittances have proven to be a strong and sustainable revenue source. Thus, while such income diversification builds resilience, market forces limit the extent to which alternative livelihood can provide a growing or stable source of income.

SOCIAL CAPITAL

Local stocks of social capital in some ways define the essential character of Malian villages. The intensity of collective action and the level of sharing in times of need are immensely important as adaptive mechanisms. The flows of food, credit, inputs, cash and many other assets follow channels designed and lined with social capital, and collective problem solving is at the core of village life and interaction. The adaptive value of social capital is revisited below.

This section compiles evidence from the field data of local strategies of adaptation. In part, these adaptive practices were introduced over the years by outside actors – public and private – but many responses have emerged from the very dynamics of household decision making and the recombining of household resources. The following section returns to the issue of governance and examines how decentralized government in its current form can support households and communities in improving and expanding their suite of adaptive practices in the face of changing climate stressors.

8. CONTRIBUTIONS OF GOVERNANCE TO CLIMATE CHANGE ADAPTATION

Given the structure and process of decentralized governance in rural Mali and the existing mechanisms of climate change adaptation, does localized governance increase resilience and prepare rural residents to respond to the projected increases in climate stressors? To begin to address this question, it is useful to understand the dynamics by which local governance confers an adaptive advantage. The framework depicted in Figure 5 proposes that the locus of climate change adaptation is found in the sets of core livelihood activities – the management of the natural resource base (water, land, and trees and forests), agriculture and pastoralism, fishing and livelihood diversification – subject to scenarios of higher temperature, altered rainfall, vegetation change, scarcer water supplies, declining river flow, etc. Fundamentally, the dynamics of adaptation are manifest and measured in the ability of households and communities to solve the concrete livelihood problems created by these pressures. How, then, does local governance facilitate this problem solving?

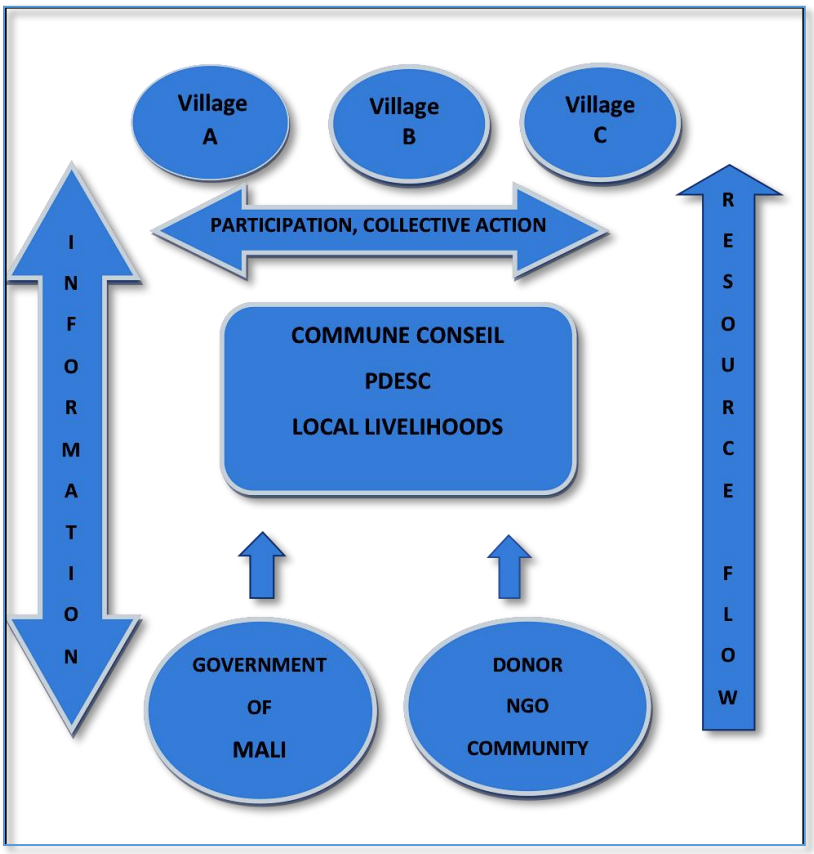
In this framework, effective institutions of governance play a “brokering” function capable of increasing access to resources (e.g., investment, technology) and information (including local knowledge) along both horizontal and vertical dimensions. In a horizontal sense, these institutions of governance articulate formal and informal linkages across villages that, in principle, create larger-scale mechanisms of the collective problem-solving process. In effect, at the commune level, effective local governance can harness the traditions of shared decision making and collective action and open formal channels of information sharing across villages, which facilitate the spread of new technology and disseminate a broader awareness of climate change and its impacts.

The vertical dimension of governance links the commune to external actors at the national and international levels, which increases the inflow of resources and information and finds a place for commune-level adaptation strategies within the national and international climate change agendas. For example, soil and water management technologies were introduced to rural Mali through NGOs and government programs and their adaptive value is widely accepted. Those communes with more effective formal governance institutions (e.g., strong elected bodies) tend to be more successful in creating the type of partnerships and linkages that attract these adaptation resources.

Thus, from a horizontal perspective, effective governance institutions can create a stronger problem-solving capacity across villages so that coordinated and articulated action is possible, information is shared in a participatory fashion across all constituents, and traditional forms of collective action are reinforced. From a vertical perspective, these formal governance institutions facilitate partnerships with external actors, both governmental and nongovernmental,

that increase the flows of information, technology and investment resources. Importantly, these two dimensions are mutually reinforcing: the more effectively participation operates horizontally, the more effective the external links become, and vice versa.

Figure 5. A framework for adaptation-oriented governance under Malian decentralization



Source: Authors.

EVIDENCE OF CURRENT IMPACTS OF DECENTRALIZED GOVERNANCE

The existing evidence from the communes in this study suggests that the determinants of climate change adaptation include adoption of technological innovations, institutional readjustments, diversification of household livelihood activities, and mobilization of social capital around collective problem solving. The question to be addressed here is whether the decentralized governance system of rural Mali enables or facilitates the effectiveness of these adaptation determinants. It is, of course, difficult to attribute a specific adaptation outcome to decentralized governance without a prior history of how livelihoods mobilized and allocated resources under the prior centralized system. However, important clues can be found in the ways in which communes and villages assess their needs, plan their pathways of development and implement and monitor their programs of resource allocation. In sum, the main focus of climate change adaptation is intrinsically linked to the PDESC as the key element of

development planning and resource allocation.

It is clear that the PDESCs are not oriented by a broad climate change agenda, primarily because more urgent and direct needs are perceived as priority. Even when these needs can be linked to climate change, public awareness about the impacts of climate change is poorly developed at the community (village) and household levels. The discussion of climate change that dominates the development community is not widespread throughout rural Mali. Nevertheless, changes in response to climate pressures or related to environmental changes have been occurring, as documented in the field interviews. It is relevant to inquire if they would have happened under a centralized governance system. In this regard, the following insights on adaptation are offered:

- Ironically, the devolution of power to local-level institutions increased the role and influence of the central government at the local level. First, decentralization transferred national party politics to the local level, since all commune members have a party affiliation, and which party dominates local-level elections has national repercussions. Second, the roles and responsibilities of locally elected bodies are extensively guided by national regulations. Third, the locally elected body has few financial and technical resources and is heavily dependent on government investment or donor/NGO project resources. In this way, decentralization provided an official voice to communes and, by extension, villages.
- Despite the differing quality and detail across communes, the PDESC is a public document that formally registers the needs, priorities and resources of each commune in the nation; even if few or no projects are actually funded, each commune has a public voice, as it were, in the national dialogue. On the other hand, this study clearly demonstrates that control over the allocation of resources through the PDESC is no guarantee of enhanced adaptation per se.
- The effectiveness of the *mairie* and *conseil* in promoting village collaboration and attracting external technical and financial resources increases the capability of managing resources in ways that support adaptation to climate pressures. The study concludes, however, that the desired effectiveness of local institutions is not achieved in many communes.
- A number of adaptation technologies have diffused widely across villages and communes, some developed endogenously, some borrowed and improved, and some imported ready-made. Particularly, land management techniques, water harvesting, micro-irrigation and improved seed adoption have been integrated into most livelihood systems, and effective decentralized governance likely played a positive role in these adaptive changes through a combination of horizontal participation and information sharing with external actors who introduce the technologies. To be sure, some of these technologies might have been introduced with more or less success in a more centralized governance system, but the study argues that the quality of local governance exercises a positive influence over access to new technologies and their rate of adoption.
- In some communes, local governance has been effective in promoting institutional arrangements that favor climate change adaptation through improved natural resource

management. Even if compliance is uneven, government regulations on forest use, especially deforestation and charcoal production, on land management (e.g., bush fires), and on collective livestock corridors are well-known at the local level by residents, elected officials and technical services. The responsibility for compliance, dispute mediation and proactive policies of environmental protection lies with the locally elected body, and in some communes, the leadership has enforced the laws, created small reserves, promoted local reforestation, established livestock corridors and instituted local rules for collective natural resource management. These positive steps are interpreted as an example of the vertical mechanisms by which decentralization can advance climate change adaptation.

- In some communes (e.g., Konna), the PDESC has supported strategies of household diversification through establishment of lands for female-managed garden plots, for improved fishing infrastructure (e.g., landing docks) and for improvements in market facilities and transportation infrastructure.
- Finally, effective governance at the commune level, as evidenced by strong horizontal and vertical stocks of social capital, seems to mobilize more external resources, both governmental and nongovernmental. With communal leadership acting as two-way brokers – horizontally across villages and vertically with government agencies, NGOs and donors – there appears to be greater access to investment and technical resources. As examples from the study region, Catholic Relief Services (CRS) introduced and continues to promote women's gardening using micro-irrigation in Konna and Kléla. In addition, Sahel Eco, a national NGO, introduced agro-ecology interventions in Konna based on farmer-managed natural regeneration (FMNR) to improve soil fertility and increase agricultural production, and it also works with women to develop their capacity for harvesting NTFP. These types of NGO-driven interventions have strong adaptation benefits and seem to have a greater probability of successful adoption where local governance institutions are more effective.[15]

It is not possible to discern whether NGOs target communes already armed with more effective local governance performance or if the presence of the NGO enables an environment of improved governance. The evidence from the study, however, indicates that most communes do not have the technical or financial resources to elaborate a development pathway that is sensitive to the increasing pressures of climate and environmental change. No widespread adaptation *vision* guides development planning, and the PDESC really tends to be much more pedestrian in its scope, focused on solving very specific, concrete, short-term and immediate problems. While not necessarily addressing larger participation and equity concerns, the local presence of an active NGO does help overcome major resource and technical constraints to development planning and can help move the PDESC toward being a legitimate planning document rather than a simple wish list or marketing brochure.

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15 It is admittedly difficult to state without qualification that in the absence of more effective governance, these NGO partnerships would be less likely, and further fieldwork would be required to analyze this question in more detail. Nonetheless, it appears that effective leadership with more visibility and strong local support does attract external resources, both financial and technical, with a higher success rate.

POTENTIAL CONTRIBUTION OF DECENTRALIZATION TO ADAPTATION

Based on the interviews and reviews of the PDESCs, enhanced local governance could contribute significantly to climate change adaptation in three areas.

- In the reality of rural Mali, very little awareness or scientific understanding exists of climate change and what it portends for both the near and distant future. This is true not only of local farmers, herders and fishers, but of communal and village-level leadership. Thus, the development planning process and its product, the PDESC, do not have an adaptation lens around which strategic projects and interventions could be organized. Current donor projects, such as the MCCAA (USAID) and the climate-proofing approach (GIZ), seek to develop such an awareness through strategic organization at the local level; however, where an external presence is lacking (such as in the study area), the PDESCs and local development processes are devoid of an adaptation orientation.
- At the same time, decentralization in Mali places the communal leadership – its *mairie* and *conseil* – at a highly strategic crossroads where it is in a position to mediate horizontally among villages and vertically across external actors at different scales. The local resource with the highest potential for adaptation is the rich trove of social capital resident in the villages, which provides the fuel for collective action and for collaborative problem solving. The future challenges of natural resource management of trees and forests, of reduced conflict between farmers and herders, of maximum efficiency of water use, and of agricultural technology adoption are all shared problems and thus amenable to collaborative problem solving. The existing foundation of participation and collective action so evident in the village interviews provides the model for such collaboration.
- A fundamental component of adaptation is information. This includes local knowledge, particularly environmental knowledge, but also information that arrives from outside the commune; e.g., climate change orientation, technology options, market information, climate forecasts, investment sources, government policies, regulations and so on. In the presence of strong leadership, the commune acts as an information clearinghouse, making sure that the information is shared with potential users.

Thus, to the extent that the *conseil* creates the spaces where collaborative problem solving is encouraged, where an agenda of actions derived from the PDESC is focused on climate change impacts and adaptive options, and where information is systematically distributed horizontally and vertically, decentralization confers an adaptive advantage on rural populations.

Unfortunately, binding constraints preclude decentralized institutions from realizing this potential for adaptation, such as the dearth of administrative capacity at the communal level (described above). To accept and foment a climate change adaptation lens – that is, to make adaptation a public goal around which the forces of collaborative problem solving can rally – it is necessary that elected leaders and residents comprehend climate change and adaptation in an operational way. As affirmed above, such is not the case. To achieve this necessary comprehension, information and knowledge on climate change must become more available through systematic

workshops, expanded media coverage and public awareness campaigns.

Finally, to achieve full potential, the financial resourcing of the PDESC has to be restructured at the national level. Even if the PDESC were to incorporate a comprehensive, informed strategy for climate change adaptation, including natural resource management and the range of livelihood systems, it would remain unviable as a long-range development plan for lack of systematic and predictable funding. Currently, local revenue sources are woefully short of financing even part of the proposed activities in the five PDESCs examined. Moreover, it should be recognized that enhanced climate change adaptation and national development objectives overlap strategically. A PDESC fashioned around a climate change adaptation framework has potential development benefits to the nation as a whole, and would potentially have access to wide variety of funding sources.[16]

16 It is noteworthy that the GOM has been very proactive in seeking to access the Green Climate Fund and appointed the *Ministère de l'Administration Territoriale et des Collectivités* to manage the resources that would come from this source. It is likely that this would imply an enhanced value for the PDESC and its role in local-level development planning.

9. CONCLUSIONS AND RECOMMENDATIONS

This study of the contribution of decentralization (local governance) to climate change adaptation in Mali sought to draw a line of argument from a description of current livelihood systems, to the nature of local environmental pressures related to global climate change, to the essential characteristics of decentralized governance as practiced in rural Mali, to an assessment of existing adaptation strategies, to the potential for local governance to improve adaptation effectiveness. The analytical insights were derived from a substantial body of textual data from field interviews with elected leaders, resident focus group discussions, individual households, and key informants in each commune. Furthermore, the PDESCs from the five communes were analyzed in detail.

In summary form, the analysis indicates that the five-year development planning process that is key to commune-level management and administration is hampered by a lack of local technical expertise (and the reliance on outside consultants), a poor record of sustaining participation in the process as evidenced by a generalized ignorance of the contents of the planning document, and the structural lack of adequate funding to make the document a true planning tool. On the other hand, the mere presence of the institutions of governance at the commune and village level does confer an adaptive advantage in the sense that it functions as an intermediary or gatekeeper through which information (on technology, government regulations and policies, etc.) and external resources can flow in both horizontal and vertical directions.

To increase the potential contribution of decentralization to climate change adaptation, a set of recommendations is offered. Each recommendation is meant to suggest concrete actions for specific development actors in Mali.

- Create within the donor community in partnership with the GOM a national coordinated strategy of support for preparation of adaptation-sensitive PDESCs. This study argues that where NGO support is present, the quality of the PDESC is enhanced, and the document gains credibility as a development plan that addresses the challenges of climate and environmental change. Such a coordinated donor strategy requires the full participation of the *Ministère de l'Administration Territoriale et des Collectivités* and its investment agency. It would provide NGO assistance in a coordinated way to groups of communes in regions where security permits access. Several donors and NGOs already provide such support. This approach would ensure a coordinated and systematic effort to integrate adaptation measures into development planning.
- Provide a comprehensive orientation on climate change and the meaning of adaptation to all *conseil* members, technical services staff and CVDs. This would be in the form of a series of workshops piloted in selected communes, followed with a regular information flow regarding specific adaptation options. This recommendation further urges an information blitz regarding climate change causes, impacts and adaptation options using

available forms of media. This learning objective would be implemented through the donor community in partnership with appropriate government services. This recommendation was specifically supported and enhanced in public discussions.

- Adjust the mandated procedures of PDESC preparation to integrate climate change adaptation as an organizational theme in development planning. This implies that the PDESC would contain an assessment of the impacts of climate change on each village and livelihood sector with a specific adaptation strategy. This was also specifically supported in the public discussion. Existing models of climate-sensitive development planning are already available for some communes where NGOs are assisting in the PDESC preparation (e.g., Konna). This recommendation requires GOM concurrence and support.
- Since there is little knowledge of the PDESC or understanding of its content among the vast majority of the population, including government technical staff in the different sectors, the study recommends a more concerted effort in making PDESC a “living” document. The restitution phase, during which the PDESC is disseminated among villages, should be more vigorously implemented (perhaps with translation of the document into the local language) and should be a continuous iterative process in which the document is discussed and systematically monitored. This recommendation requires GOM concurrence and a revision of existing guidelines.
- Improve the monitoring and evaluation of the PDESC. Currently, there is no evidence that the impacts of a five-year plan are systematically assessed as an input into the development of the new plan. Although a formal structure of monitoring and evaluation is mandated for the *mairie*, it does not appear that a systematic review of the outcomes of one PDESC (including lessons learned) informs the preparation of its successor. Strategic development requires a longer vision than five years, and continuity across planning activities will improve the effectiveness of the process. This recommendation is directed to the GOM and requires a revision of existing guidelines.
- Redesign the financing of strategic development goals so that the adaptation elements of the PDESC have the necessary financial support to guarantee implementation. To achieve a realistic planning instrument, the donor community should coordinate with GOM financing agencies (e.g., ANICT) to identify the financing mechanism that will support the PDESC adaptation projects.

These recommendations cannot be operationalized working only at the commune or village level. Some require changes in current policy and some have significant resource implications, particularly the restructured financing of the strategic development plans. Collaborative partnerships between the GOM, donors, NGOs and locally elected bodies are necessary to address these recommended actions; however, the future of climate change adaptation in Mali and elsewhere will certainly depend on such a level of collaboration.

For the USAID/Mali mission, these recommendations imply three concrete actions to support the role of governance in local-level climate change adaptation:

- First, the Mission is in a position to help organize a dialogue among GOM agencies (e.g., ANICT, AEDD), donors, NGOs and private sector stakeholders for the purpose of creating a comprehensive strategy for introducing adaptation content into local-level

development planning. This strategy would contain intervention content (similar to the climate-proofing approach) and targeting indicators.

- Second, the Mission could integrate into its existing programming an initiative for the widespread orientation or education of local officials regarding climate change adaptation and how they could plan for it at that level. This action moves beyond enhancing public awareness of climate change to assisting locally elected officials to operationalize climate change components into local development planning.
- Third, the Mission could pilot climate change interventions in local-level development plans through the existing MCCAA already working on PDESCs in selected villages.

Last, the body of stakeholders brought together for the public discussion could form a useful sounding board (or a formal advisory committee) for MCCAA and future activities.

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ANNEX A: ADDITIONAL CHARACTERISTICS OF THE COMMUNES

COMMUNE OF OURIKÉLA

The main activities of Ourikéla district are agriculture, livestock rearing and fishing. Despite its potential of developing 500 ha of lowlands, the district still lacks developed agricultural lands for gardening. A key district priority is to develop 50 gardening plots (2 ha per plot of land) and protect them with a fence. Cotton production occupies a significant place in the district's agriculture. For instance, the villages of Tiby and Farakoro receive a lot of help from the Malian company for textile development (CMDT), which supports production by providing inputs and seeds on credit, agricultural equipment and trainings in composting and building stone bunds. The institution also supports the CPCV (Association of Cotton and Food Producers) in terms of organization and cooperation between members of the same association. Cotton cultivation helps these villages to implement community projects and cover education, health and household items, but often this money comes late and does not help households in lean periods.

Livestock rearing is the second main activity of Ourikéla district after agriculture, but the actors of this sector are not well organized. The potential for cattle (15,258 head), sheep (4,834 head), and goat (6,437 head) farming is significant, but the district has no abattoir to develop a meat processing capacity. Although the fowl population is considerable (246,384), there is no incubation center for poultry farming and small ruminants. In addition, there are no livestock markets or vaccination centers. The district has only 15 fish farming ponds. Trade is not well developed in Ourikéla district, but there are cotton and mango commercialization opportunities.

Table A1 provides details on livelihoods for each representative village of the commune.

Table A1. Livelihood characteristics of the commune of Ourikéla

Village	Vegetation	Ethnic groups	Main livelihood activities	Main crops	Use of ecosystems and trees	Use of water resources	Local Markets	Livelihood strategies
FARAKORO	Dense shade vegetation with big trees (observed destruction of the canopy). Clayey and sandy soil for cotton and maize farming.		Agriculture, livestock rearing, market gardening, trade, sewing, carpentering, paid jobs. Processing of shea nuts into butter and African locust beans into soumbala.	Cotton as cash crop; maize as staple food.	There are trees whose fruits are consumed by the population such as shea and African locust trees. Hills and plains are dedicated to pasture.	Drinking water comes from boreholes. Well water is used for household activities and animals' drinking.	Ourikéla (2 km), Zeoulena (12 km), Karangana (15 km) and Sougounba (22 km) to sell grains and animals, and to buy condiments, clothes, etc.	Cotton farming, tree cutting for charcoal and firewood, NTFP processing.
PALASSO	Presence of trees; the soil is clayey.	Mianga, Bambara, Dogon and some Fulani	Agriculture, livestock rearing, market gardening, trade, handicraft, sewing, mechanics and carpentering in addition to paid farming jobs.	Agriculture: maize, millet, sorghum, rice, cotton, soybean, beans, peanut and dah (roselle plant); gardening products.	There is a space for pasture in the village.	Well water is dedicated to drinking/ household activities. Plains water used for animals, rice cultivation, gardening and fishing.	Ourikela (7 km), Karangana (22 km), Koury (30 km) and Zeoulena (12 km) to sell grains and buy household products.	Many migrants send money to their families.
TIBY	The vegetation is made up of many trees because the area has enough rainfall and the soil is clayey.	Minianka (dominant), Fulani and Bobo	Agriculture, livestock rearing, market gardening, carpentering, handicraft, trade, forestry, fishing and masonry. Agriculture is practiced in rainy season; all other activities are practiced throughout the year.	Cotton as cash crop; maize as staple food. A crop rotation is observed between cotton and maize.	Many trees are part of the population's food such as the shea tree, whose nuts are processed for butter. Liana and baobab tree fruits are consumed. There is a space for pasture in the village.	Well water is used for drinking and for household activities; the river is dedicated to fishing and animals' drinking.	Ourikela (12 km), Zeoulena (12 km) and Diona (15 km), to sell millet and animals and buy things such as condiments.	Many young people migrated from the village in search of money to help their families. There is also NTFP processing.

COMMUNE OF KLÉLA

Agriculture is the most practiced activity in the commune. Kléla commune's population cultivates mostly cotton on large areas of land. Farmers are abandoning grains (millet, rice, corn and sorghum) for cotton production to receive fertilizer from the CMDT. Land quality is getting poorer because of the intensive use of chemical fertilizers. In 2009, the total area of land covered by cotton production was 8,581 ha, with annual production of 9,827 tons. For the same year, the area planted in millet was 5,787 ha, with production of 5,705 tons, and for rice, 349 ha with production of 872 tons.

The village of Zerelani has five tractors for cotton mechanization. Loutana village is also a big producer of cotton; its farmers own 62 tractors. One farmer has six tractors and produces 70 tons of cotton per year. These two villages are also assisted by the CMDT, which established an association of cotton and food producers (CPCV). It takes care of agricultural inputs and organizes the sale of cotton, enabling producers to meet their daily needs. Women produce rice in the plain, with some producing up to 100 sacks per season. This is also true for Dougoumoussou village where ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) and N'gasene NGOs provide fertilizers and grain seeds to women. Grain production exceeds the needs of the commune but there is no market organization to allow export of the surplus to urban areas such as Bamako, Segou and Koulikoro.

In terms of livestock, the potential for cattle (12,019 head), sheep (13,891 head), goat (11,576 head) and fowl (149,570) farming is very high (SLPIA 2009). However, the commune has no abattoir or transhumance paths developed for animals.

The district has schools, water resources and an operational health center, but roads are poor. Loutana is well-developed in terms of infrastructure, transport and agricultural equipment thanks to the CMDT and some NGOs such as Save the Children, P.S.I Mali and others.

Table A2 provides details on livelihoods for each representative village of the commune.

Table A2. Livelihood characteristics of the commune of Kléla

Village	Vegetation	Ethnic groups	Main livelihood activities	Main crops	Use of ecosystems and trees	Use of water resources	Markets	Livelihood strategies
DOUGOU-MOUSSO	Vegetation abundant, but threatened; chemical fertilizers have compromised soil quality.		Agriculture, livestock rearing, fruit plantations (mango), charcoal and firewood production for sale, trade, carpentry, masonry, sewing, mechanics for bikes and gardening.	Cotton (mostly farmed by men), peanut, sorghum and millet (by women on farms abandoned by men). Other crops include maize and beans.	There is a space for pasture on the hills.		Markets include Kléla (6 km), Fama (15 km), Loutana (6 km), Deh (12 km), Koro barrage (42 km), Fo (20 km) and Sikasso (57 km) to sell smithy articles, to fix shoes (animal skin), to sell animals and grains, and to buy condiments and other household items.	Tree cutting for charcoal and firewood. Mechanized cotton farming with new techniques (spreading of seeds with seed drilling machines and tractors).
LOUTANA	Trees threatened due to extensive agriculture.		Agriculture, livestock rearing, gardening (especially potato), fishing, trading, metalwork, carpentry, mechanics, masonry, tractor driving, traditional singing, TV repair, bike repair, and handicrafts.	Cotton (very important), rice (women's main activity), potato, millet, maize, sorghum, soybean, sesame, beans and peanut.	Some people process shea nuts (into butter), African locust beans (into soumbala), *Jatropha curcas* (into soap), liana and plum tree (into juices). There is a pasture in an abandoned farming area.	There is a river 8 km away dedicated only to fishing activities.	The markets frequented are Kléla (6 km), Fama (12 km), Warasso (22 km) and Sikasso (36 km) to sell grains and animals or to buy agricultural inputs, condiments and clothes.	New activities like mechanized cotton farming (use of tractors), livestock rearing, gardening (potato), driving tractors (paid job), NTFP processing, and tree cutting for charcoal and firewood.
ZERELANI	Big trees like cailcedrats, baobabs and shrubs (liana trees). Clayey and sandy soil.	Senoufo (largest ethnic group), Miniankas, Fulani, Bambara and Dogon	Agriculture, livestock rearing and animal fattening, trade, orchards, market gardening, metalwork, carpentry, masonry, sewing, weaving, mechanics and butchery.	Cotton (very important), maize, sorghum, millet, peanut, fonio, rice, soybean, potato, sesame, cassava, sweet potato and garden products.	There is a space for pasture in the village.	Tap water is used for drinking, toilet, and household activities while river water is used for animals' drinking and wells are dug in rivers for gardening.	Kléla (15 Km), Koro barrage (24 km), Fo (8 km) and Sourounkola (5 km) to sell garden products, grains and animals, and to buy condiments and household items.	Nonagricultural sources of income are trade, masonry, carpentry, metalwork, butchery, sewing, weaving and mechanics.

COMMUNE OF KOULA

Koula commune has three community health centers (located in the district's county seat, Tombougou village and Sizani village), as well as two rural maternity wards based in Dialakoro and Monzona. The commune has eight public schools, two high schools, nine community schools, five development education centers, three madrassas, and three operational literacy centers (located in Dialakoro, Koula and Djèni). However, the village of Bouana has no school so children go to school 5 km away at Kafola. As the village lacks a health center, inhabitants often go to Tombougou Hospital, which is 8 km away.

Several technical and financial partners support the commune's development:

- DIVAROF NGO – water, hygiene and sanitation
- CARA (a Japanese NGO) – education and health
- IPRO-REAGIR – agriculture, livestock breeding and rural road construction
- Emergency Works Cell – building bridges
- The Malian Association for the Sahel Development (AMAPROS), in partnership with Diakonia NGO – climate change

Table A3 provides details on livelihoods for each representative village of the commune.

Table A3. Livelihood characteristics of the commune of Koula

Village	Vegetation	Ethnic groups	Main livelihood activities	Main crops	Use of ecosystems and trees	Use of water resources	Local markets	Livelihood strategies
BOUANA		Bambara	Agriculture, livestock rearing, market gardening, small trade, handicraft (mat weaving), and processing of shea nuts into butter and African locust beans into soumbala.	Millet, sorghum, corn, sesame, peanut and dah. Animals are cattle, sheep, goats, donkeys and hens.				Youth leave for gold mining, trade and other jobs in nearby towns or they go abroad to work in coffee and cocoa farms. These migrants send back money to help their families in periods of drought and flooding or in lean periods. There is also NTFP processing.
TIESSEM-BOUGOU	The vegetation is made up of grasslands, and trees such as shea and mango trees planted by the population.	Bambara, Fulani and Kakolos	Agriculture, livestock rearing, charcoal production, trade, fishing, brick production and shea butter sales.			Well water is used for drinking, livestock watering and household use.	Sirakora (30 km), Koulikoro (30 km) and Koula (12 km) to sell and buy animals and food.	Seasonal migration with youth travelling to Koulikoro, Bamako and Niono for market gardening activities and to Kayes for farming jobs and gold mining; they return to the village in the rainy season to help their families. They transfer money and send remittances to help families. A microfinance group gives credit to women.
WOLONGO TOBA SOCORO		Bambara	Agriculture, market gardening, and livestock farming. Migration.	Millet, sorghum, cotton (family farming), peanut, sesame (cash crop), dah, beans and peas (*wandzou*).	Processing of shea nuts into butter; African locust beans into soumbala; baobab leaves and nuts and the cailcedrats leaves are used in traditional medicine.			NTFP processing, internal migration (Bamako, Kayes and Sikasso gold mines), migration abroad (travel to Cote d'Ivoire, Spain, Italy and France) and cotton farming.

COMMUNE OF MINIDIAN

The main economic activities of the Minidian commune's population include agriculture, livestock rearing, fishing, trading and gold mining. Gold mining is traditionally practiced by the majority of the population (mostly women and youth) because gold-mining sites are everywhere in the commune.

The commune has thirteen middle schools, five high schools, one institute for teacher training, two secondary schools, one madrassa, one kindergarten, one daycare center and three centers for education development. Its social and health care facilities include the health center, social development center, and the maternity wards of Deguela and Kela. Farmers' organizations and women's associations are often assisted by public institutions and NGOs.

In Minidian, the village of Kela is the library of the Mandé people because there are traditional poets who know the history of Soundiata Keita (founder of the Mali empire) and many poem singers are from Kela. The village has two sacred baobab trees that, according to oral tradition, are said to be the bodies of a man and a woman who turned into baobab trees. People go to confide in them when they have problems (job, child, health, and others).

Table A4 provides details on livelihoods for each representative village of the commune.

Table A4. Livelihood characteristics of the commune of Minidian

Village	Vegetation	Ethnic groups	Main livelihood activities	Main crops	Use of ecosystems and trees	Use of water resources	Local Markets	Livelihood strategies
BALANDO UGOU II			Gold mining is one of the most developed activities; it has the richest underground in the district, attracting people from various regions. In addition, activities include agriculture, market gardening, livestock rearing, tree planting, trade, and metalwork, carpentry and bike mechanics.	Maize, sorghum, beans, peanut and groundnut (*wandzou*) vegetable products.	Gold mining has negative impacts because wood is used a lot in this activity and vegetation/fields are cleared to make gold-mining sites. There is a space for pasture, but it is reducing due to the expansion of farms and gold-mining sites.	The only river used for fishing is polluted with silver ad mercury used in gold mining.	Kangaba (12 km), Kouremale (40 km) and Bankoumana (42 km) for the sale of animals and garden products and to buy condiments and inputs.	Gold mining and market gardening
DAMBALA	The vegetation is along the river and there are some tree in the village for shade.	Somono (an ethnic group known for fishing and as masters of water because they can spend hours under water), Bambara, Malinke, the poets and Fulani	Fishing activities and gold mining; other activities include agriculture, livestock rearing, market gardening, trade, forestry and motorbike repair.	Rice (main staple food).	There are trees like the baobab, shea and African locust. People use the leaves and bark of “doubale” (a tree) as medicine to treat some diseases. There is a pasture made of trees and grass alongside the river.	There is a plain around the village that is often fed by river water for the production of rice.	Frequented markets are Kangaba (1 km), Fou (8 km) and Figuira (3 km) to sell fish and buy grains, condiments and clothes.	Gold mining (semi-modernized extraction techniques), market gardening, NTFP processing and sale.
KELA		Malinke, Bambara and Fulani	Agriculture, livestock rearing, market gardening, trade, carpentry, masonry, metalwork, bike mechanics, traditional poetry, fruit tree planting, traditional healing and fishing.	Rice (main staple food), maize, peanut, dah, sorghum, sesame and okra.	Excessive woodcutting for charcoal production, firewood and farming have reduced the number of trees in the village.	There is a river nearby the village. There is a space for pasture for the village on the hills.	Kangaba (6 km), Balanzan (12 km) and Fou (behind the river at 7 km) to sell agricultural products, animals and garden products and to buy condiments and agricultural inputs.	Market gardening, charcoal production and migration to gold-mining sites in other communes the dry season.

COMMUNE OF KONNA

Agriculture is practiced by a significant part of Konna commune's population. The main crops include rice, millet, cowpea and peanut. Gardening is practiced in a confined, limited area. Livestock rearing comprises a significant number of cattle, sheep and fowl. Fishing is the third main economic sector, practiced on the Niger River. Fish production is very important because it supplies Mopti, Bamako and other markets. The fish are sold fresh or smoked by Bozo women to traders from Mopti, Segou, Koutiala and Bamako. The types of fishing in different seasons include fishing with large nets, and fishing with hoop net.

The district faces problems of water flow, silting and other water flow obstructions. It also lacks grazing paths to move herds when local grazing is low – this is a source of conflict between livestock breeders and farmers.

Other income-generating activities practiced in the commune include the sale of grains, fish and cattle feed, gardening spaces and dairy products. Women are more involved in the manufacturing of mats, pottery, weaving, shoe repair and dyeing. Jewelry making is practiced by men. Difficulties in the manual labor sector are mostly related to the lack of raw material and the supply of inputs.

In 2016, 70.00 percent of children were enrolled in school, compared to 48.33 percent in 2010. In 2010, there were 26 elementary schools, 3 development education centers with 33 learners, 5 operational literacy centers, 2 preschools and 22 literacy centers. There were 4,612 students, of which 2,210 were girls. The district has 90 teachers. However, it has only two community health centers (Konna and Kontza Fulani).

Table A5 provides details on livelihoods for each representative village of the commune.

Table A5. Livelihood characteristics of the commune of Konna

Village	Vegetation	Ethnic groups	Main livelihood activities	Main crops	Use of ecosystems and trees	Use of water resources	Local Markets	Livelihood strategies
DIANWELI	The vegetation comprises few trees, mostly *Faidherbia albida*, *Balanites* and palmyra palm.	Fulani, Bambara and Dogon	Livestock rearing, agriculture, market gardening, trade and handicrafts.		Evident progression of the desert. The population consumes fruits from trees such as the jujube tamarind, *sousou*, plum, Palmyra palm and *bekou* (wild grape).	There is no river in the village. There are traditional wells, a large diameter well and a tap.	Konna (6 km), Fatoma (20 Km) and Sambèrè (13 km) to sell grains and livestock or buy condiments and animals.	Market gardening, trade, handicraft and migration for work.
KONZA BOZO	The vegetation comprises balanites with some shrubs and Palmyra palm trees at the riverfront.	Bozos (60%) (normally living on fishing); Soninke (30%); Bela (6%) and Fulani (4%).	Fishing activities, livestock rearing, trade and agriculture. People pay the Fulani to rear their animals.	Rice, millet and sorghum.	The village faces an obvious, serious progression of the desert.	There is a river 4 km away, on which the population practice fishing with fishing smack, and boat transportation.	Konna (15 km), Koréanze (30 km), and Mopti market (66 km) to sell fish and buy condiments.	Agriculture; women collect cow dung for cooking; brick production, migration for work and masonry.
SAMA	The vegetation comprises *Faidherbia albida,* balanites, Palmyra palm trees and *Boscias senegalensis*. The soil is sandy with a little mud.		Agriculture dominates other activities. Also livestock rearing, handicrafts and fishing.	Millet, sorghum, rice, beans, peanut, dah and garden products			Konna (1 km), Fatoma (41 km), Dere (35 km), Bore and Mopti (60 km) to buy and sell garden products.	Change in livestock herd (abandonment of horse rearing), migration for work, and fishing.

ANNEX B: STEPS FOR THE ELABORATION OF A PDESC

Preparation of the PDESC (*Plan de Développement Economique, Social et Culturel*), as compiled from various sources

Step 1:	**Establishment of the institutional and technical process**
Step 2:	**Training of planning process stakeholders (commission)**
Step 3:	**Development of terms of reference (TORs), cost estimates for the development of the PDESC and of the communication plan, and appreciation of available budget thresholds for implementation of the future district PDESCs**
Step 4:	**Awareness campaigns for local authorities and populations**
Step 5:	**Evaluation of the previous PDESC**
Step 6:	**Data collection for development of the technical diagnosis or reference situation**
Step 7:	**Procurement of common technical standards and list of costs by the technical departments**
Step 8:	**Organizational and methodological preparation of participative diagnoses**
Step 9:	**Organization of participative diagnoses sessions per village**
Step 10:	**Organization of intercommunity consultation days**
Step 11:	**Synthesis of the diagnosis process**
Step 12:	**Determination of development orientations and PDESC goals**
Step 13:	**Programming workshop**
Step 14:	**Drafting of the preliminary version of the PDESC**
Step 15:	**Provisionary reporting at district level**
Step 16:	**Validation of the PDESC**
Step 17:	**Dissemination of the PDESC**

ANNEX C: PUBLIC WORKSHOP AND DISCUSSION

An English version of the presentation made at the public workshop event on October 31, 2016 is available here. A summary of recommendations made during the public workshop is found in Annex D.

ANNEX D: SUMMARY OF RECOMMENDATIONS FROM THE PUBLIC WORKSHOP

A public presentation and workshop entitled *Etude de Cas: Gouvernance et adaptation aux changement climatiques au Mali* was held at the Centre Aoua Keita in Bamako, Mali on October 31, 2016. The 45 participants included Government of Mali (GOM) policy makers and technical staff, Mali Climate Change Adaptation Activity (MCCAA) staff, donors and NGO representatives.

SUMMARY OF WORKSHOP RECOMMENDATIONS[17]

Twenty recommendations (in French) emerged from the workshop breakout groups and were presented in a final plenary session. For this summary, the 20 recommendations were distilled to 7, eliminating repetition and combining recommendations around a similar theme. The resulting recommendations are organized to demonstrate an underlying strategy for improving local-level governance as a mechanism of climate change adaptation.

Recommendation 1: Define and compile the information needed for climate change adaptation at the local level.

In the interest of creating a common commune-level dataset designed to inform climate change adaptation planning, it is recommended that the consortium of relevant stakeholders (including key government agencies, donors, NGOs and private sector firms) establish a set of climate change indicators that are universal across communes. These indicators will be used to assess local determinants of vulnerability to climate variability and define where community resilience building is possible. The indicators – defined through a consensus process – might include a time series on selected climate variables (rainfall levels, temperature, wind velocity, frequency of rainfall, duration of the rainy season and related floods and droughts), land use patterns, vegetation types and livelihood characteristics. As part of this effort, it is also recommended that current and past climate adaptation projects be mapped out across communes to provide a comprehensive summary of the distribution of adaptation strategies.

Recommendation 2: Increase public awareness of climate change and adaptation.

It is recommended that existing local institutions strong in social capital be mobilized to raise awareness of climate change adaptation. The women's saving groups found in every village are a particularly opportune institution for climate change outreach learning. These groups are already engaged in social learning (e.g., awareness about malaria); the introduction of climate change learning would therefore reach a large existing audience in the local populations.

Recommendation 3: Develop the tools and mechanisms necessary to integrate climate

[17] These recommendations are summarized from the Report of the Presentation Workshop, prepared by Sahel Eco.

change adaptation into the PDESC development planning process.

To promote a commune-level planning process that is sensitive to climate change adaptation, several actions are recommended:

- Assure that the information described in Recommendation 1 is made available to the planning process.
- Enhance the participation of villages in the PDESC preparation with improved transparency in setting of priorities.
- Systematically integrate public actors in the preparation of the PDESC, particularly government technical staff (agriculture, livestock, natural resources, etc.), so that their annual work plans are consistent with the activities of the PDESC.
- Invite technical and financial actors (NGOs, etc.) to make their contributions consistent with the priorities of the PDESC.

Recommendation 4: Prepare local-level land use plans.

Each village/commune should prepare a land use zoning plan that establishes where different livelihood activities are best supported and regulated and where investment resources are most efficiently directed. It is further recommended that land tenure systems (customary access, private ownership) be studied in terms of their impact on climate change adaptation options.

Recommendation 5: Enhance the mechanisms of participatory monitoring and evaluation of development plans and projects.

Improvement of monitoring and evaluation systems at the local level entails these components:

- Increase the effectiveness of the current national systems of monitoring and evaluation responsible for the PDESC plans (CROCSAD, CCROCSAD, CLOCSAD, etc.).
- Improve capacity at the commune level to participate in the design, execution and monitoring and evaluation of public works, including infrastructure.
- Assure that new development planning takes into account the previous PDESC.
- Set clear indicators of evaluation for development projects in the PDESC at the beginning of project implementation.

Recommendation 6: Enhance the mechanisms of project financing at the commune level.

Given the disconnect between the development planning process and the availability of resources, financing strategies should be restructured with enhanced, detailed budgeting of development projects at the local level, with links to national adaptation funding sources.

Recommendation 7: Translate the study report into French and disseminate throughout the communes.

Translation of the full report is under consideration but, in any case, the report's Executive Summary and other informational materials will be made available in French.

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