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# Envisioning the future and learning from the past: Adapting to a changing environment in northern Mali

Maria Brockhaus<sup>a,\*</sup>, Houria Djoudi<sup>a</sup>, Bruno Locatelli<sup>a,b</sup>

<sup>a</sup> Center for International Forestry Research (CIFOR), Jalan CIFOR, Situ Gede, Bogor, Barat 16115, Indonesia

<sup>b</sup> Coopération Internationale en Recherche Agronomique pour le Développement, (CIRAD), Montpellier, France

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## ABSTRACT

In West Africa, rural livelihoods depending on natural resources develop coping and adapting strategies to face climate variability or change and economic or political changes. The former Lake Faguibine in northern Mali has experienced drastic ecological, social, and economic changes. Forests have emerged on the former lake and have become important for local livelihoods. This paper analyses the coping and adapting strategies of forest- and livestock-based livelihoods facing ecological changes. Results from field research at different levels indicate that most local strategies are based on diversification including migration within the livestock production system or in complement to it, with differences according to gender, age, and ethnicity. Political discourses, cultural identities, and past experiences influence and shape adaptation strategies at the local level. The sustainability of the observed strategies depends on the access to natural resources and the sustainable management of these resources, which in turn depends on institutions at local and national levels. Many local strategies are reactive to external events but would need strategic support from higher levels to move from coping to adapting. Examples are the development of institutions and technical actions for natural resource management, as well as development actions supporting local strategies and sustainable investments. Researchers, practitioners and development planners will need simple methods and tools for understanding and analysing local adaptation perceptions and actions to achieve an effective support of sustainable and gender-equitable local adaptation and to avoid mismatches between strategies proposed by local and by sub national and national actors.

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## 1. Introduction

Vulnerability and adaptation to external shocks and changes, whether societal, economic, or climatic, have long been a reality of life for societies. Climate change threatens to create an additional burden on already vulnerable groups. As the body of evidence on climate change impacts grows, so too does awareness of the need to adapt to climate change (McCarthy et al., 2001; Burton et al., 2002; Parry et al., 2007). Reducing the vulnerability of socio-ecological systems to climate change is a challenge for organisations, groups, and individuals, from the

global to the local level (Adger, 2006; Ribot, 2010). As adaptation first takes place at the local level, it is important to understand what “adaptation” means locally and how socio-ecological systems respond to multiple stressors, including climate change and variability (O’Brien et al., 2004; Van der Geest and Dietz, 2004; Mertz et al., 2009).

Perceptions of adaptation and its priorities vary across scales and levels (Smit et al., 2000). National adaptation planning processes and their outputs, such as the NAPAs (National Adaptation Programmes of Action, a process for Least Developed Countries), do not always capture local specificities—a necessary aspect for supporting existing

\* Corresponding author at: PO Box 0113 BOCBD, Bogor 16000, Indonesia. Tel.: +62 251 8622622; fax: +62 251 8622100.

E-mail addresses: [m.brockhaus@cgiar.org](mailto:m.brockhaus@cgiar.org) (M. Brockhaus), [h.djoudi@cgiar.org](mailto:h.djoudi@cgiar.org) (H. Djoudi), [bruno.locatelli@cirad.fr](mailto:bruno.locatelli@cirad.fr) (B. Locatelli).  
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adaptation efforts and local institutions in planning sustainable adaptation strategies (Agrawal, 2009; Stringer et al., 2009). This gap can lead to increased vulnerability or maladaptation by disproportionately burdening the most vulnerable, generating high opportunity cost, or creating path dependencies that will limit the choices of future generations (Barnett and O'Neill, 2010); as Eriksen et al. (2011) put it, because of unexpected consequences and negative externalities, “not every adaptation is a good one” (Eriksen et al., 2011:1). In this context, therefore, the key questions concern (1) what is experienced as adaptation, (2) what is perceived as preferred adaptation, and (3) what the enabling conditions are for successful and sustainable adaptation.

Inadequate technological solutions and strategies relying on unsustainable resources may increase the risk of maladaptation. For example some irrigation projects can increase soil salinity, affect freshwater ecosystems, and deprive some farmers from access to water (Klein et al., 2007); forest product harvesting as an adaptation strategy provide short-term incomes but can degrade forest in the long term (Djouidi and Brockhaus, 2011). The lack of congruence between stakeholders' views on adaptation and the lack of knowledge of policymakers about local adaptation can lead to ill-informed policies and maladaptation. In the Sahel, for example policies and projects increasing sedentarism of pastoral communities reduce the flexibility of livestock herders to cope with drought (Mortimore, 2010). As adaptation depends on local ecological and social realities, addressing local diversity is crucial for understanding local adaptive capacity (Agrawal, 2008; Paavola, 2008).

In this paper, we applied a set of methods and participatory tools to analyse local strategies for coping with, or adapting to, ecological changes in a context of political and economic changes in Northern Mali. We compare preferences and perceptions of adaptation at the community, district, regional and national levels. We discuss key issues of coping and adaptive strategies: their effect and dependence on natural resources, the role of social interactions and local institutions for the sustainability of strategies, and the implications of conflicting views on adaptation strategies.

The findings contribute to a deeper understanding of the complexity of coping and adapting strategies in Northern Mali. They highlight the need to analyse the interactions between strategies and natural resources, in order to explore the sustainability of strategies. They show the relevance of mixed methods for analyzing strategies at different levels and gender differentiated, for example to understand the effects of political discourses, cultural identities, and experiences on strategies. Such analyses can be useful to identify sustainable adaptive strategies and to avoid maladaptation.

## 2. Theoretical background

### 2.1. Coping and adapting

The Intergovernmental Panel on Climate Change defines adaptation as “an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects,

which moderates harm or exploits beneficial opportunities” (McCarthy, 2001: 869).

This definition has a strong focus on the specific threats caused by climate change and variability. However, the adaptation of livelihoods to broader environmental, economic and political changes has been studied previously, for example with the sustainable livelihood framework (Chambers and Conway, 1992; Scoones, 1998; Ellis, 2000). This framework focuses on how people use livelihood assets (human, natural, financial, social, and physical) in a context of shocks, trends and seasonality. The choice of strategies is mediated by structures (e.g., levels of government, private sector) and processes (e.g., laws, policies, culture, institutions) and results in livelihood outcomes, such as income, well-being, or food security (Chambers and Conway, 1992; Ellis, 2000).

The IPCC distinguishes several types of adaptation: anticipatory (or proactive), reactive (or autonomous or spontaneous), and planned adaptation (“the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state” McCarthy, 2001:869). By contrast, Heyd and Brooks (2009:275) defined maladaptation as the “pursuit of policies and practices which make people more vulnerable to changes in the natural environment in which human systems are embedded”.

The definition of adaptive strategies remains ambiguous. Arguably, “adaptive strategies” is a catch-all term used to describe any action beyond primary production activities (Davies, 1993). Van der Geest and Dietz (2004) defined coping strategies more accurately and distinguished them from adaptive strategies. “Coping” can be defined as a spontaneous reaction to crisis, mostly at the local level (Osbah et al., 2008), but often reflect a constant trade-off between immediate subsistence and long-term sustainability, in particular in the context of small-farms (Frankenberger and Goldstein, 1990). Ravera et al. (2011) drew on definitions in Osbah et al. (2008) and Nayak (2004) to differentiate between (1) coping mechanisms as unplanned reactions undertaken spontaneously and regularly by local people in response to crisis; and (2) adaptive strategies as planned, frequently revised, and mainly longer-term actions to be implemented.

### 2.2. Adaptation in the Sahel

The Sahel is currently experiencing complex economic changes (e.g. in markets), political changes (e.g., decentralisation and changes in land tenure or access to resources), and climatic changes and variability (e.g., drought). Since the severe droughts of the 1980s, scientists have studied the local livelihood strategies developed in reaction to external stressors. Livelihoods have undergone a continuous process of coping with environmental, economic, and political stressors, by adjusting their strategies or adopting new ones (Brooks et al., 2009). Under environmental uncertainty and high spatial variability in precipitation, pastoralists have developed flexible individual and collective strategies for coping in reaction to shocks. Mobility of people and animals through transhumance and migration represents a pillar in the adaptation of livestock systems to climate variability (Brooks et al., 2009). A wide range of technical and institutional innovations such as

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