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# Vulnerability to Climate Change of Turkana pastoralist of dry savanna

F. López-i-Gelats<sup>1</sup>, J. Bartolomé<sup>2</sup> and M. Rivera-Ferre<sup>1</sup>

<sup>1</sup>Center for Agro-food Economy and Development CREDA-UPC-IRTA, Parc Mediterrani de la Tecnologia, ESAB Building, C/ Esteve Terrades 8, Castelldefels (Barcelona) 08860, Catalonia (Spain)  
e-mail: feliu.lopez@upc.edu; marta.guadalupe.rivera@upc.edu

<sup>2</sup>Department of Animal and Food Science, Universitat Autònoma de Barcelona, Campus UAB, Bellaterra (Cerdanyola del Vallès) 08193, Catalonia (Spain)  
e-mail: jordi.bartolome@uab.cat

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**Abstract.** Pastoralism is a dynamic grassland management system which implies complex and multiple interactions among people, livestock, environment, as well as local and traditional knowledge and formal and informal institutions. In Turkana, a region located in Northern Kenya, most of the population's livelihood depends on extensive herding. Most of them are experiencing the adverse impacts of changes in climate, particularly recurrent droughts and occasional floods. This is threatening the socio-ecological balance they are part of. Some argue that pastoralists are among the most vulnerable to climate-related hazards. However, others maintain that they are well-equipped to tackle climate change, as they have proved throughout history. What is the case in Turkana? By means of a set of interviews to Turkana pastoralists and relevant stakeholders in the region we attempt at shedding light on this question. While it is obvious that pastoralists have been adapting and trying to remain flexible for centuries, and that this has allowed them to live in the dry land ecosystems of Eastern Africa; it is also evident that several socioeconomic trends are hindering their adaptive capacity.

**Keywords.** Pastoralism – Dry grassland – Adaptation strategies – Vulnerability.

## *Vulnérabilité des bergers au changement climatique à Turkana (Kenya)*

**Résumé.** L'élevage pastoral est un système dynamique de gestion des pâturages, qui implique l'existence des nombreuses et complexes interactions parmi les gens, le bétail, l'environnement, ainsi que les institutions et les savoirs locaux et traditionnels. À Turkana, une région située au Nord du Kenya, la plupart des gens sont éleveurs qui pratiquent un élevage pastoral. Ils sont en train d'expérimenter les mauvais effets du changement climatique, particulièrement sécheresses récurrentes et de temps en temps inondations. Ceci est en train de menacer l'équilibre socioécologique duquel ils font partie. Quelques-uns soutiennent que les bergers sont parmi les plus vulnérables aux risques du changement climatique. Toutefois d'autres maintiennent qu'ils sont très bien équipés pour faire face au changement climatique, comme ils l'ont bien démontré à travers de l'histoire. ¿Qu'est-ce qui se passe à Turkana? Moyennant des interviews à des bergers et à des acteurs concernés de Turkana on a essayé de mieux comprendre cette question. Tandis que c'est évident que les bergers ont été adaptés et ont essayé de rester flexibles, et que ça leur a permis de vivre dans les écosystèmes sèches de l'Afrique de l'Est, il est aussi évident qu'il y a plusieurs tendances socioéconomiques, qui sont en train d'entraver les bergers de mieux s'adapter.

**Mots-clés.** Élevage pastoral – Pâturages secs – Stratégies d'adaptation – Vulnérabilité.

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## I – Introduction

The effects of climate change are being felt by the populations of pastoralists worldwide. Pastoralism is a dynamic system, which implies complex and multiple interactions among people, livestock, environment, as well as local and traditional knowledge and formal and informal institutions. In Turkana, a region located in Northern Kenya, most of the population's livelihood de-

depends on extensive raising of zebu, camels, goats and sheep. Most of them are experiencing the adverse impacts of changes in climate, principally recurrent droughts and occasional floods. This is threatening the socio-ecological balance they are part of in tropical grasslands.

It is widely spread the opinion that sees rain-fed agriculture, and particularly pastoralism, as highly vulnerable to climate-related hazards (Cooper *et al.*, 2008; Thornton *et al.*, 2009). Thus, some argue that pastoralists are among the most vulnerable to climate-related hazards as, for instance, rangelands and water points dry up (Calvosa, 2009). Whereas others maintain that they are well-equipped to tackle climate change, as for centuries they have been developing strategies of adaptation to mutable environmental conditions and resource scarcity (Davies and Nori, 2008; WISP, 2007). What is the case in Turkana?

## II – Materials and methods

Dry and pastoral lands occupy more than 80% of Kenya, and are home to approximately 4 million pastoralists, who comprise more than 10% of Kenya's population (Kirbride and Grahn, 2008). Turkana is a semiarid region located at Northwestern Kenya. It shelters a population of one million people, who identify themselves as Turkana and also speak the Turkana language. Pastoralism is their main source of livelihood. Despite the importance of zebu raising, the Turkana also raise goats, donkeys and camels. In recent years, development aid programs have attempted at introducing fishing and irrigation schemes among the Turkana Lake, with limited success (Watson and van Binsbergen, 2008).

By means of a set of interviews conducted to Turkana pastoralists and relevant stakeholders in the region, we attempt at shedding light on the adaptation capacity of Turkana pastoralists to changes in climate. Specifically, a total of 25 interviews was conducted, 11 to male pastoralists, 6 to female pastoralists, 6 to local association members, and finally 2 to regional civil servants - veterinarians. The following groups of items were tackled extensively in the interviews: (i) main type of changes in climate being experienced; (ii) impacts of these changes on: livestock, grazing resources, agricultural practices (where relevant), water availability, state of the surrounding ecosystems, existence of conflicts over scarce resources within and among communities, implication in gender issues, state of the traditional knowledge; (iii) existence of additional socio-economic drivers exacerbating climate change's impacts; and finally (iv) the adaptation strategies being implemented to face the upcoming changes in each domain.

## III – Results and discussion

Recurrent droughts, occasional floods, and increasing calendar unpredictability are the climate events that Turkana pastoralist communities have been adapting to in the past few decades (Birch and Grahn, 2007; Galvin *et al.*, 2004; McCabe, 1990; Oba, 1992). Pastoralism is highly dependent on the maintenance of a sophisticated and constantly evolving balance between pastures, water, livestock, peoples and their surroundings. The following groups of adaptations strategies (Table 1) have been identified as being implemented by Turkana pastoralists to preserve such equilibrium (for a more in-depth analysis see Rivera-Ferre and López-i-Gelats, 2012): (i) enhancing mobility, what entails moving herds to areas with better grazing and water conditions and securing access to critical resources during difficult times; (ii) boosting social collaboration and reciprocity, what implies adopting strategies such as food sharing, livestock loans, joint ventures, friendly collaboration, communal planning, communal ownership, splitting the herd among different members of the family, communal grazing, and labor exchange, what strengthens the sense of belonging to a commonality and increases the resilience of the community to future changes by fostering mutual support and exchange of knowledge and capacities; (iii)

favoring diversification and multi-purpose strategies, as a precautionary strategy to diminish the risk of losses in front of potential unexpected changes; and (iv) preserving and promoting biodiversity, both wild and domesticated, including shifting towards other types of livestock more adapted to the approaching new socio-ecological conditions, such as browsers – camels, goats. The anticipatory and endogenous nature of these adaptation strategies, as well as their cost-effectiveness, indicate that much can be learned from Turkana pastoralist communities to adapt to climate change in dry lands.

**Table 1. Adaptation strategies to climate variability implemented by pastoralist in Turkana**

<b>Autonomous</b>	<b>Planned</b>	<b>Autonomous/Planned</b>
Enhancing mobility	Empowering community	Adoption of fodder crops/
Boosting social collaboration and reciprocity	Schemes of sedentarisation	pasture enclosures
Favouring diversification/multi-purpose strategy		
Promoting biodiversity		

Other adaptation measures that have been identified as being undertaken in Turkana pastoralist communities are those promoted by external institutions. These include (v) empowering the community members by offering them services and training, such as schooling, health care, and pastoralist field schools; and (vi) offering to these communities schemes of sedentarisation, food relief and improved market access, to try to improve their livelihoods. Other strategies can be either endogenous or promoted by external institutions, depending on the particular context, such as (vii) adoption of fodder crops and pasture enclosures, what in some occasions also implies livestock corralling, to guarantee more stable feeding conditions for the livestock.

It is obvious that pastoralists have been adapting and trying to remain flexible for centuries, and that this has allowed them to live in the dry land ecosystems of Eastern Africa. However, diverse socioeconomic trends are hindering their adaptive capacity to climate change by impeding the development and promotion of this type of livestock farming. These are: (i) demographic growth, (ii) neglect of pastoralist knowledge, customary practices, and institutions, in policy-making, and (iii) increasing integration of pastoralist societies within the market economy. These drivers are impelling gradual dismissal of local traditional knowledge, abandonment of communal planning and institutions, increase in social differentiation, and overexploitation of the limited resources of rangelands. Also rising tensions, both within the community and among communities, and growing levels of malnutrition, are being witnessed in Turkana with dramatic consequences. Thus, to guarantee the endurance of pastoralist communities in Turkana, it is needed to overcome this set of socio-economic drivers. In particular, interceding to reduce the hostility among neighboring pastoral communities, and adjusting the humanitarian aid towards more restocking and training to pastoralists instead of food relief, would entail significant improve in the medium term in the livelihood of Turkana pastoralist communities.

## **IV – Conclusions**

Pastoralism is a sophisticated - e.g. communal planning and ownership of resources, nomadism, etc. - and productive - e.g. animal source food, draught power, fiber, social status, keeping savings, etc. - use of grassland resources. It guarantees the livelihood of millions of people worldwide, while contributing at the same time to sustainable environmental management. Thus, it should be borne in mind that most of these adaptation strategies are practices that pastoralist communities have been traditionally undertaking to guarantee their livelihoods in climate margins, such as drylands, mountains and cold regions (Rivera-Ferre and López-i-Gelats, 2012). It has been only recently acknowledged the importance of these practices as adaptation strategies to changes in climate.

Results suggest that Turkana pastoralist communities are well prepared to face climatic variability. The long experience of these communities in overcoming changes is clearly shown on the fact that the majority of endogenous adaptation strategies are also of an anticipatory nature. This must be carefully considered by policy makers. On the contrary, this is not so clear in the case of those adaptation strategies being promoted by donor agencies. These planned adaptation strategies should be cautiously implemented. It should be carefully assessed if they are really empowering the community. In so doing, it is necessary to take into consideration the social, cultural, economic and geographical contexts within which these strategies are put into practice, so as to assess what unintended consequences might arise, and include pastoralists in the policy-making process. Thus, while endogenous adaptations by pastoralist communities should not be romanticized, top-down interventions should always be critically assessed.

The knowledge, institutions and customary practices of pastoralist communities, highly adapted to the local conditions and developed throughout centuries of coevolution with changing environments, can be of a great value to adapt the whole livestock sector to the current situation of increased climate variability. However, to guarantee the endurance of pastoralism and its related benefits in Turkana, there is the commanding need to overcome a set of socio-economic drivers, which are hindering the development and promotion of pastoralism.

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