



What drives the vulnerability of pastoralists to global environmental change? A qualitative meta-analysis



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ABSTRACT

The long-term viability of pastoralism has been a constant theme for discussions. The progress of knowledge on the sustainability of pastoralism under global environmental change has been notable in the last years. To better characterize this vulnerability, we have examined the existing scientific knowledge about the three dimensions of vulnerability, being exposure illustrated by the existing climate trends and non-climate transformations, sensitivity by the impacts of these on pastoral resources and pastoral land conversions, and adaptation by the adaptation strategies developed by the pastoral communities. A qualitative meta-analysis was conducted to explore patterns and trends across the literature. From this, six different pathways of vulnerability being followed by pastoral communities were identified: Encroachment, Re-greening, Customary, Polarization, Communal and No-alternative.

The results point that the livelihood options of pastoralists are generally becoming narrower. Four major forces are identified as exerting determinant influence on the co-production of the vulnerability of pastoralism: (i) the double exposure to climate and non-climate transformations, (ii) the persistence of unfavorable development policies, (iii) the great vitality of adaptation, and (iv) the multifaceted role of markets. We point that it is crucial to distinguish between the component of vulnerability inherent in any economic activity devoted to the use of natural resources, which is the usual business of pastoralism, and the component of vulnerability linked to external forces that disturb the usual working of the pastoral production strategies.

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1. Introduction

The long-term viability of pastoralism has been a continuous theme for discussions and the progress of knowledge on the survival of pastoralism under global environmental change has been notable since the mid-2000s. Thus, while some assert that pastoralism is disappearing due to internal causes – e.g. that the current climate change falls beyond its adaptive range (Steen, 1994; Markakis, 2004; Sandford, 2006) – others trace the foundations of the pastoral fragility back to its settings in marginal areas and unfavorable environmental conditions (Jónsson, 2010). This combination of factors is said to create “multiple stressors” that undermine pastoralism (Thébaud and Batterbury, 2001;

Mihlar, 2008). Others disagree and argue that pastoralism is better suited than other land uses to do well under changing environmental conditions (Bradley and Grainger, 2004; Davies and Nori, 2008; Jones and Thornton, 2008). In line with this, greatly varying and sometimes directly contradictory advice, a range of policy recommendations oriented towards pastoral peoples coexist in the literature. There is great controversy whether the development policies directed to pastoralists, particularly from states and development agencies, to change their lives, settle and modernize, are adequate (Scoones, 1995; Chatty and Colchester, 2002; Morton, 2010a; Dong et al., 2011; Krätli et al., 2013). Opposed positions can be found on either the beneficial or the harmful effects of development interventions such as economic diversification, market integration, humanitarian relief, education or sedentarization schemes (e.g. Krätli and Dyer, 2009; Valdivia et al., 2010; Rivera-Ferre and López-i-Gelats, 2012). This does not help to stop the implementation of inadequate development policies, which eventually constitute additional barriers for

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pastoral livelihood and management. It is thus relevant to examine what drives pastoralists' vulnerability to global environmental change and its implications. Specifically, little attention has been paid to the complex and location-specific nature of pastoralism (Hinkel, 2011), as well as to the implications of non-climate drivers on the continuity of pastoralism (Morton, 2010a; Below et al., 2012; McDowell and Hess, 2012). In view of that, the purpose of this paper is to identify both the multiple drivers affecting pastoralism under global environmental change and the diverse 'pathways of vulnerability' being followed by pastoralists, and defined as the diverse development trajectories followed by specific pastoral peoples under different global environmental change conditions. Patterns and trends across the literature on the viability of pastoralism under global environmental change were explored through a systematic review and meta-analysis. In particular, we focused on scientific literature comprising case studies based on primary data.

2. The notion of pastoral vulnerability

We start by recounting a brief genealogy of the most influential lines of thought in defining pastoral vulnerability. The first studies can be traced back to the 1930s, 1940s and 1950s with the works of Troll (1931, 1966) on human geography of extreme climates, and the ethnographic works of Evans-Pritchard (1940) and Stenning (1959) on pastoral organization in arid and semiarid Africa. However, it was not until the 1970s and 1980s that pastoral research took off. Research was dominated by cultural ecology approaches aiming to understand in what ways pastoralists responded to environmental change. Attention was placed on the effects of environmental stress on the management and organization of pastoralists, particularly in Africa and Mideast. Based on mobility, diversity of species and management flexibility, these studies underlined the pastoral rationality in responding to changing and patchy resource distribution (Dyson-Hudson, 1972; Dyson-Hudson and McCabe, 1985; Fratkin, 1986; McCabe, 1990). Despite the in-depth understanding provided by these fieldwork-based studies, this social anthropological approach exerted a marginal influence on policy development (Morton, 2010b). During that period development policies were fundamentally driven by the conviction that pastoral lands were unoccupied or poorly utilized, justifying their appropriation for more appropriate land uses (Nori et al., 2008).

In contrast, the influence on policy arenas of the ecological approaches that followed Hardin's 'tragedy of the commons' thesis (1968) was overwhelming. Following the Lotka-Volterra model of predator-prey dynamics, the tendency of pastoralists to maximize their herds, together with growing populations, was regarded as leading to overgrazing, desertification and environmental degradation. Pastoralism was viewed as disturbances in the rangeland system rather than an inextricable part of it (Little, 1994). The notion of carrying capacity was brought to the fore. Pastoralism was then pictured not only as economically unproductive, but also as environmentally damaging and socially backward (Swift, 1996; Nori et al., 2008). Dismantling common property, destocking and endorsing commercial ranching were seen as the fundamental pillars where policy interventions should rest to stop rangeland degradation and enhance the pastoralists' socio-economic development (Lamprey, 1983; Simpson and Evangelou, 1984). Initiated in Western mentalities for Western environments, this line of thought soon became the world dominant doctrine among policy-makers and developers and it is still exerting a major influence nowadays.

Nonetheless, criticisms of this thesis emerged questioning the meaningfulness of the notion of carrying capacity in changing environments and claiming the need to distinguish in land tenure

between communal and open access. Building on this, two main critical perspectives rejecting environmental determinism and stressing the role of wider driving forces in understanding the pastoral-rangeland relations can be identified. The first one centered on political processes, which described trends of economic stratification within pastoral groups because of the contact with sedentary agricultural states and resultant processes of political encapsulation of pastoralists (Asad, 1970; Salzman, 1974; Marx, 1977; Equipe Écologie et Anthropologie des Sociétés Pastorales, 1979; Beck, 1986; Bradburd, 1990; Khazanov, 1994). The second one stressed that both pastoral rationality and policy development had to be rethought in light of the ecological evidence that most of the rangelands are fundamentally unstable ecosystems, where the equilibrium theory does not apply and uncertainty is the norm (Sandford, 1983; Ellis and Swift, 1988; Behnke et al., 1993; Behnke, 1994; Scoones, 1995). For the proponents of the new range ecology the equilibrium assumption lying behind traditional range ecology and policy development, based on enhancing predictability and single function system, through initiatives such as erecting fences, favoring sedentarization and meat market orientation, is simply a replication of the dynamics and solutions more appropriate for temperate and more predictable climates. They argue that because of decoupled plant-herbivore interactions, pastoralists have little impact on rangelands (Fernández-Giménez and Allen-Diaz, 1999; Sullivan and Rohde, 2002; Lind et al., 2003; Derry and Boone, 2010). Thus, pastoral vulnerability is fundamentally viewed as of external origin, being resource access more central than stocking rates.

Based on the premises of the new range ecology, some authors have developed a pastoral economic model alternative to the conventional risk-aversion archetype, which sees pastoralism as a high-reliability system (Roe et al., 1998; Krätli, 2008; Roe and Schulman, 2008). Rather than picturing pastoralism as a coping strategy to deal with inadequate resource base, it is seen as an economic strategy distinctive of unpredictable environments and developed to exploit the variable and patchy resource distribution of rangelands. Pastoralism is seen as operating not by avoiding risk, but by employing it as the very base of production. They believe that the pastoral economic system is 'proactive, methodical and geared at value creation and maximization, rather than mere survival' (Krätli and Shareika, 2010). To them, analytical tools that highlight stability and uniformity and consider asymmetric distribution of resources as undesired disturbances are not adequate to analyze pastoral systems and design development policies. However, despite substantial progress in the understanding of rangeland ecology and pastoral rationality, the emergence of climate change as a central policy issue, in conjunction with the evidence of numerous pastoral development policy failures, is fueling once again a new wave of claims that question the continuity of pastoralism as a result of its internal incapacity to deal with the current environmental variability and prevent poverty (Sandford, 2006; Morton, 2010b).

Academics from multiple disciplines have long been interested in understanding how nature and society are interlinked. The notion of vulnerability we employ results from this endeavor, with recent integrated approaches, which picture the nature-society interlinkages as coupled human-environment systems and highlight the double essence of vulnerability as socially and naturally produced, being increasingly adopted to understand the implications of global environmental change (e.g. Turner et al., 2003; Ionescu et al., 2009; Fraser et al., 2011; Ribot, 2011). Following this literature, to understand the implications of global environmental change for the viability of pastoralism, we adopted an integrated notion of vulnerability, which comprises exposure, sensitivity and adaptation as the three fundamental dimensions of vulnerability (Kasperson et al., 2005; Adger, 2006; Gallopín, 2006). Exposure is

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