

# Enabling sustainable pastoralism: policies and investments that optimise livestock production and rangeland stewardship

R. Ouedraogo & J. Davies

International Union for Conservation of Nature, P.O. Box 68200 – 00200 Nairobi, Kenya  
E-mail: razingrim.ouedraogo@iucn.org; jonathan.davies@iucn.org

## Summary

Pastoralism is a system of dynamically managing livestock and land for economic, social and environmental benefit. To a large extent, pastoralism is an adaptation to ecological and climatic variability and is not simply a livestock production system but provides significant environmental services to humanity. Evidence from a range of national contexts shows that sustainable pastoralist development requires an understanding of the dual environmental and economic roles of pastoralism and an adaptation of policies and investments to support both. The current paper examines three cornerstones that have proven to be crucial for sustainable pastoralist development and for maximising the links between livestock production and environmental stewardship: strengthening pastoral capabilities and institutions, securing land tenure and natural resource governance, and ensuring equitable markets for pastoral diversity.

To effectively support the dual economic–environmental roles of pastoralism requires not only optimisation of the production of ecosystem services through extensive livestock production, but also a major overhaul of the way we approach pastoralist development, and major investment in the people who are central to the system. As long as pastoralists remain marginalised, with weak rights and little access to services, their future will remain uncertain.

## Keywords

Extensive livestock production – Land tenure – Pastoral capabilities – Pastoral diversity – Pastoralism – Rangelands governance – Sustainable pastoralism.

## Introduction

This issue of the *OIE Scientific and Technical Review* examines many facets of pastoralist development, with significant emphasis on measures to develop extensive livestock production systems and value chains. In this paper, the authors discuss a different pastoralist development pathway that combines livestock production with the delivery of environmental services. This is a development pathway that is common worldwide and one that provides numerous credible success stories. However, policies in both the livestock and the environmental sectors have been seen to present barriers to this alternative development pathway, and a different vision of pastoralist development is needed to guide the development of more suitable policy frameworks and investments.

There is abundant evidence supporting the view that pastoralism is not simply a livestock production system but provides significant environmental services to humanity. Pastoralism protects water sheds such as the Tibetan Plateau, which is the source of the Yangtze, Yellow and Mekong Rivers: river systems that support over a billion people in the world's most populous region. Pastoral rangelands contain more than a third of all the terrestrial above- and below-ground carbon reserves and play a major role in regulating climate. Pastoral lands also host around a third of the world's biodiversity, and this includes the pasture and browsing species that are the bedrock of the pastoral economy. In a world that is placing ever-greater demands on nature, and where the capacity of the planet to support humanity is under threat, these rangeland ecosystem services are of growing value, and the role of pastoralists in securing them is increasingly important (1).

Pastoralism is a dynamic system of livestock production in highly heterogeneous and unpredictable environments. Pastoralists manage rangeland biodiversity, including pasture, shrubs, trees and other natural resources, to provide high-value livestock products for both sustenance and trade. Sustainable management of rangelands by pastoralists delivers many additional goods and services, including those mentioned above, some of which have higher economic value than livestock products. A recent study in Jordan, for example, showed that rangeland restoration can lead to increases in water supply that are of 20 times greater value to society than the increase in livestock revenue. At the same time, the value of both climate change mitigation and reduced sedimentation (on downstream dams) through rangeland restoration outweighed the increase in livestock production. The catch, however, is that, of all these significant values, only the increases in livestock productivity currently accrue to the pastoralists who are responsible for land management (2).

The list of environmental services from pastoralism is long – to those already mentioned can also be added the protection of biodiversity corridors and connectivity between landscapes – and their aggregate value globally is great. Examining pastoral systems worldwide shows that, where pastoralism is thriving, it is usually through a combination of rewards for both livestock and non-livestock goods and services. The key to sustainable pastoralist development, therefore, appears to be the optimisation of a range of values, as opposed to maximising outputs of individual goods (1).

Many pastoral systems depend on the production of more than one livestock species and more than one product per species. Bedouin herders in Jordan, for example, keep sheep and goats and sometimes camels, producing milk, fibre, meat and hides. Several pastoral communities in eastern Africa add cattle to this mix, usually with milk as the highest-value product, bolstered by significant contributions from meat and hides. This diversity mirrors the ecological diversity of the rangelands and is a vital element of managing risk, as it ensures that different ecological niches (e.g. pasture and browse) can be used, different climatic periods can be survived, and different marketing niches can be satisfied. Value chains for these diverse products are often weak, however, and, since data on agricultural economies are gathered in the marketplace, pastoral economies are frequently undervalued (3, 4). In terms of economic value, in many developing countries, pastoralism is a significant contributor to the national Gross Domestic Product (GDP), contributing between 10% and 44% of the GDP of African countries, and benefiting up to 1.3 billion people along the livestock value chain worldwide (5).

Moving towards sustainable pastoralism, based on optimal production of a range of goods and ecosystem services, requires major shifts in our understanding and acceptance

of pastoralism and in the policies and investments that support it. It requires an upgrading of knowledge among those who are responsible for pastoralist development and better evidence to inform decision-making. New skills are needed among pastoralists and among those supporting their development. Action is also needed to address fundamental development barriers: poor access to education, health and markets; insecurity and weak rule of law; climate change; weakening of local institutions; insecure land tenure; demographic changes; and urbanisation. Sustainable pastoralist development often requires that all these constraints be addressed simultaneously, presenting unique challenges to development partners, and often leaving pastoralists sidelined from development in favour of easier targets.

Some of these aspects of pastoralist development are addressed elsewhere in this publication and are not touched on in this paper. This article focuses on three cornerstones that have proven to be crucial for sustainable pastoralist development and for maximising the links between livestock production and environmental stewardship:

- i) strengthening pastoral capabilities and organisations
- ii) securing land tenure and natural resource governance
- iii) ensuring equitable markets for pastoral diversity.

## Strengthening pastoral capabilities and institutions

The complexity of the challenge of pastoralist development, combined with poor awareness among public servants and development partners of the appropriate development pathways, are persuasive reasons for approaching pastoralist development through a rights-based approach and through the strengthening of capabilities. Pastoralists hold much of the knowledge that is critical for the management of their system, and they own the institutions that are necessary for their system to be effectively governed. The challenge for development practitioners is to find ways to support, rather than replace, pastoral knowledge and institutions, and to support pastoralists to upgrade their systems by taking on board new ideas and concepts that are appropriate.

People's ability to make free and informed choices about the day-to-day decisions that affect them are determined to a large extent by their capabilities. Capabilities are obviously of inherent value, but they are also of practical value in enabling pastoralists to make practical decisions, e.g. over the adoption of new management strategies or technologies, or embracing (or rejecting) new market opportunities. Capabilities are heavily influenced by public investment and access to basic infrastructure for economic

development, such as schools, surfaced roads, electricity and communications. In pastoral areas, the coverage of such amenities is poor and school enrolment is often low. Whilst most of these issues are discussed elsewhere in this publication (6), the focus here will be on three practical steps that have been mainstreamed into a variety of development initiatives in order to strengthen capabilities (7):

- i) strengthening capacities of local organisations and the institutional space in which they operate
- ii) avoiding and managing conflicts
- iii) encouraging collaborative learning.

### **Strengthening capacities of local organisations and the institutional space in which they operate**

Local organisations are instrumental in enabling pastoralists to sustainably manage their resources and build livelihood resilience. The capacity of both community and state organisations at the local level is key to effectively addressing many of the challenges facing pastoralism. This includes the ability of organisations and individuals to interact and collaborate in ways that support responsible development, manage conflict, promote learning and innovate. Relationships between stakeholders, and between people and processes, are central to the capabilities of organisations and the individuals within them (8).

Capabilities that can be strengthened through appropriate development approaches include: the capability to interact and engage with multiple stakeholders; the capability for learning and innovation; the capability for coordination (for example, between government agencies) and to build trust; the capability to secure tenure and other rights; and the capability to manage the intersection of ecological and social resilience (7).

The development approach adopted by different stakeholders can greatly influence the development of capabilities. Top-down and non-participatory development approaches may disempower pastoralists and undermine their capabilities. On the other hand, development approaches that emphasise empowerment and participation, which build partnerships between communities and local government, and which help to establish a space for dialogue and building trust, can contribute to strengthening capabilities, which can have an impact far beyond the immediate reach of the intervention.

Institutional capabilities are vital for sustainable management of rangeland resources, particularly given the communal nature of pastoral management and the challenges of coordinating resource use. Often, development solutions revolve around strengthening hybrid institutions that act as intermediaries between customary institutions and

government. Pastoralist organisations, such as professional associations, cooperatives and pasture users' groups, need to be strengthened to take a lead role in development decision-making, and to be the interface between pastoralists and other actors in the public or private sectors (9).

### **Avoiding and managing conflict**

Conflict affects the ability of pastoralists to achieve their development potential, undermining food security and livelihoods and often contributing to environmental degradation by disrupting patterns of seasonal resource use. Conflicts over the control of land and water resources between farmers and pastoralists are most common along the areas where farming and pastoralism intersect. Pastoralism in some regions, or within some countries, has become synonymous with conflict, and yet a global perspective of pastoralism shows it to be highly tuned to managing conflict, often in the absence of effective state institutions for security. Customary institutions for conflict management are well established and, in many cases, conflict arises where these institutions have been weakened. Often, they have been weakened as a result of the emergence of state power and yet, in many cases, the state has been unable to replace the conflict-management role of the institutions that it has eroded.

Avoiding and managing conflict between pastoralists and other land users, especially farmers, is essential for sustainable economic and social growth.

Conflict is often complex and can be caused by multiple triggers. Conflict 'multipliers' include phenomena such as land grabs, foreign land investments, and climate change, many of which are aggravated by insecurity of tenure. Underlying factors in conflict include the erosion of local governance arrangements and the expropriation of natural resources or alienation from services and decision-making. In this respect, conflict is often exacerbated by a long-term failure to provide security and basic services, and to uphold basic rights, including common land rights (10).

Understanding the triggers of conflict is a crucial step in its mitigation. As mentioned above, triggers can be related to weak capabilities and lack of trust. The capacity for conflict mitigation can therefore be increased by strengthening traditional institutions and reinforcing social cohesion and social relations. Stronger governance and decision-making processes may be needed to ensure fairer and more transparent decision-making and this may require efforts to establish clearer tenure arrangements. In some of the poorest pastoral communities in the world, conflict management depends on addressing the factors that underpin structural inequity.

In several countries, pastoralism is practised in areas that are bisected by national boundaries. Moreover, these are areas that, as discussed earlier, have been deprived of basic services, including security. It is therefore unsurprising to find that, in some regions, pastoral areas are affected by international conflict and by extremist groups such as Al-Qaïda au Maghreb islamique (Al-Qaeda in the Islamic Maghreb), Boko Haram and Al-Shabab. These forms of insecurity affect pastoral livelihoods and pastoral management of the rangelands, and contribute to poverty and migration, in many ways that deserve closer attention.

### **Collaborative learning**

Collaborative learning is essential for strengthening institutions and for building constructive relationships between community and public institutions. The capacity for collaborative learning has been shown to be central to resilient and adaptive societies. It can contribute to the evolution of a shared development vision, more effective problem-solving, and to more comprehensive, holistic thinking from development partners. In a pastoral development context, collaborative learning may be the only way to overcome entrenched stereotypes and misrepresentation of pastoralists (11). For example, participatory processes can be used to identify suitable, integrated responses for Health, Education and Veterinary Services (12).

Collaborative learning can also be a powerful tool for addressing the previous two challenges: managing conflict and strengthening institutional capabilities. Well-designed learning processes can establish trust and develop shared visions for development that, in turn, can help to resolve drivers of long-term conflict. Collaborative learning can help to develop the ability for innovation and for developing creative and credible solutions for sustainable pastoralism. Collaborative learning can also help to overcome the lack of coherence between the epistemologies of different stakeholders, i.e. the different knowledge systems of different parties to a negotiation and their different ways of doing things (13).

## **Securing land tenure and natural resource governance**

Customary land tenure and governance arrangements in pastoral societies are highly complex and have evolved to deal with the necessity of communal resource management, the large geographic scale of operation, the seasonality of resource use, and the vital importance of small, but often heavily coveted, resource patches within pastoral rangeland landscapes. Pastoralist land rights consist of an assemblage of different rights regarding access, management and the

control of resources, each encompassing different aspects of 'property'. Within a given area, different groups or individuals may have rights of use, rights of management, rights to control resources and, in some cases, absolute property rights. This leads to a complex set of overlapping rights that are continuously under negotiation (14, 15).

Pastoral tenure systems are based largely on mutual trust and reciprocity, mediated through traditional institutions and both formal and informal negotiations (16). Reconciling these tenure systems with statutory law may be the greatest development challenge that pastoralists face. Formal laws often lack the subtlety to deal with local nuances and constantly shifting rights and responsibilities. Whilst communal tenure in the rangelands of many developed countries is relatively secure, in most developing and emerging economies pastoral resource tenure remains weak. Furthermore, as those countries endeavour to secure resource rights, and as laws and policies evolve, pastoral lands are often threatened. Individualisation of tenure is a particular threat in most rangelands, where communal management brings advantages of flexibility and mobility. Population growth and the preference of many governments to expand crop cultivation leads to many pressures on pastoral lands (17).

Three steps have been shown to have a significant impact in strengthening the governance of natural pastoral resources and contributing to more secure tenure in the rangelands (7, 9):

- recognising customary systems and building synergy with statutory systems
- improving decision-making over land, particularly through stronger participation
- linking land managers (pastoralists, farmers, wildlife managers, etc.) and government to develop integrated planning for land use at relevant scales.

### **Recognising customary governance and building synergy with statutory systems**

Pastoral customary governance and tenure arrangements have been shown many times to be a highly effective way of managing the diversity, heterogeneity and uncertainty of rangeland resources. Whilst these institutions are often found to be eroded, reviving them, or supporting their adaptation to the evolving social and political context, has often provided a strong foundation for sustainable development. A growing number of examples around the world show how this can be achieved through building local institutions and strengthening relationships (9).

The Voluntary Guidelines on Responsible Governance of Tenure (18) have been endorsed by over 100 countries.

They provide a new international framework to guide policy to protect and enhance land rights, including those of pastoralists. The guidelines spell out, in Part 3, 'Legal recognition and allocation of tenure rights and duties', the principles for protecting the rights of indigenous peoples and other communities with customary tenure. Clause 9.5 states: 'Where indigenous peoples and other communities with customary tenure systems have legitimate tenure rights to the ancestral lands on which they live, states should recognise and protect these rights. Indigenous peoples and other communities with customary tenure systems should not be forcibly evicted from such ancestral lands.'

Clause 9.6 notes that: 'States should consider adapting their policy, legal, and organisational frameworks to recognise tenure systems of indigenous peoples and other communities with customary tenure systems'. The Voluntary Guidelines thereby strengthen the legitimacy of and respect for customary governance of pastoral land (18).

The Voluntary Guidelines provide an overall framework for strengthening tenure, but local solutions are required to link customary rules and regulations with statutory law. Securing pastoral rights often begins with building networks of relationships that support herders' interests. These networks are the basis of establishing social and political relations to secure the role of pastoralists on rangelands. A crucial platform for securing tenure is to obtain the commitment and involvement of government in participatory processes with pastoralists. Where governments are explicitly opposed to pastoralism, this may require a change in attitudes at the national level but, more often than not, solutions are pioneered locally, at a scale where closer relationships can be established – or already exist – between pastoralists and authorities. The involvement of government is vital in finding durable legal solutions (9).

There are a growing number of examples of hybrid institutions being established to create an interface between pastoralists and the state. Effective hybrid institutions, such as pasture-user groups or rangeland associations, have the advantage of being officially sanctioned, usually through legal instruments, and are themselves governed by rules and regulations that provide transparency and accountability. This lends credibility to local institutions and thus pastoral management in the eyes of the state. When hybrid institutions operate effectively, they are designed to build on local knowledge and local practices, and are over-seen by local leaders, giving them legitimacy in the eyes of the local land user. The most effective institutions are those that also respect gender equity, giving pastoralist women a clear voice in decision-making. Such institutions are crucial for bringing together local knowledge and practices with other knowledge systems and alternative practices, enabling pastoralists to give free, prior and informed consent in

public decision-making, and frequently providing the entry point for innovation in rangeland management (7).

### **Improving decision-making, particularly through stronger participation**

Strengthening pastoral governance requires an investment in building human, social and political capital. Where governance has been strengthened or revived, it is usually associated with strengthening the social fabric through participatory approaches and building grassroots organisations among pastoralists. Participatory approaches are well recognised within the development sector, but the ingredients of effective participation are less well understood. It is common to find participatory approaches abused to meet the pre-determined goals of donors or development agents, or used as a rubber stamp on decisions made by those in power.

To be effective, participation must be full, meaningful and effective and it should be a habitual practice rather than a one-off event. Building capacities for participation at the level of both communities and local government can be instrumental in sustainable development. Full participation means including marginalised groups within pastoral society, such as women, as much as it means ensuring the involvement of pastoral communities in public decision-making. Effective participation is often the foundation on which trust can be built to enable effective dialogue and respect for different forms of knowledge: local as well as exogenous. Improving decision-making requires a strong commitment from government to be accountable to pastoralists.

Pastoralists sometimes lack the required skills and the opportunity to influence decision-making at the right level or to negotiate over their rights. Pastoral communities may be represented by articulate and charismatic leaders, but they often face competition from wealthy, powerful and well-connected corporate interests. If governments are serious about sustainable development of pastoralism, they must recognise the need for stronger political representation and the importance of upholding the rights of pastoralists over their land and other resources.

### **Linking land managers and government to develop integrated land-use planning at relevant scales**

Integrated land-use planning is frequently recommended as a means to more efficient use of ecosystems, but in practice it is rarely achieved, particularly in pastoral lands. However, achieving the most efficient use of natural resources requires commitment to integrated planning and management. This is not an abstract concept: vast areas of rangelands have

been rendered unproductive or been degraded because small pockets of key resources have been allocated for other uses, such as irrigated crop farming. The returns from those other uses may appear higher on the small area they occupy, but the overall cost to society is often far greater through the erosion of pastoralism in the wider landscape (3).

It is increasingly recognised that an optimal balance of ecosystem services can be delivered in the rangelands, and maximising a single service (such as food production) leads to an inefficient use of resources (19). Protecting multi-functional rangeland landscapes, for the combined services of food, water, biodiversity, climate regulation, disaster reduction, and many more, requires a comprehensive master plan for the use of rangelands that guides investment and policy at different scales. Whilst few countries can boast a clear national land-use planning framework, the following section will illustrate that many countries have effectively moved in this direction by incentivising the production of multiple ecosystem services from rangelands. However, in a greater number of countries this remains an entirely foreign vision of the future of pastoralism. The current emphasis on sustainable development, as evidenced by the adoption of the Sustainable Development Goals, needs to be exploited to generate awareness of the multiple values of land and to motivate governments to explore options for protecting and optimising these values.

## Ensuring equitable markets for pastoral diversity

Improved access to markets for livestock products, fairer livestock prices, higher-quality livestock products (20) and more reliable markets are now key development objectives for many pastoralists, as reflected in the contributions to this issue of the *Review* (21). The market integration of pastoral economies increasingly represents a determining factor for their welfare in many regions and varies substantially around the world. However, in some countries the response to this challenge is inadequate, overlooking several of the direct values of pastoralism as well as most of the indirect values (4).

As already discussed, the most efficient use of rangelands can be achieved through recognising and incentivising multiple ecosystem services. In this section, the authors briefly discuss three areas where market mechanisms have been used to combine improvements in pastoral livelihoods with promotion of the environmental sustainability of the system:

- expanding value chains for the multiple livestock products of pastoralism

- capitalising on the environmental and health credentials of pastoral products
- incentivising the non-livestock services of pastoralism.

### Expanding value chains for the multiple livestock products of pastoralism

Other articles in this publication provide a more detailed insight into strengthening markets for pastoral livestock products (21) and these issues will not be repeated here. However, a critical aspect of pastoralism which is overlooked in livestock marketing strategies in many developing countries is the diversity of livestock products that are integral to the system. In many countries, notably in Central Asia, in the High Andes, and in European mountain systems, pastoral marketing focuses on 'live products': typically fine fibre (e.g. cashmere or Alpaca) or milk. In these systems, meat and hides are secondary products, albeit products that generate important secondary revenues. Studies of African pastoral systems have similarly shown that milk is often the highest-value output – between two and four times greater in value than meat – yet markets for milk are poorly developed and face many challenges (20, 22). Considering the capacity that pastoralists have for adaptation to market forces, there may be risks associated with a market bias towards a narrow range of products and greater efforts are needed to develop value chains for dairy products (3).

Market development for pastoral livestock products must be tailored to the local context and the livelihood objectives of pastoralists. An example of this is found in Gujarat, India, where manure represents one of the most valuable livestock outputs and is traded for fodder through grazing contracts on crop residues. Milk continues to be an important product in these systems, but the sale of livestock for meat is usually culturally taboo. Manure is an undervalued commodity in most pastoral systems, particularly its role in maintaining soil fertility and accelerating nutrient cycling. When inorganic fertilisers are aggressively promoted, for example through subsidies in countries like India, this can undermine important pastoral markets and lead to widespread disruption in pastoral systems.

### Capitalising on the unique credentials of pastoral products

Pastoral products are perceived by many consumers as being of higher intrinsic value, due to their production conditions and the environment in which they are produced. There are a number of examples of pastoralists trading on this value and tapping into niche markets for certified goods, such as alpine cheeses in Switzerland, or for unique pastoral products, like camel wool in Mongolia. In some cases, pastoral products have been shown to have unique properties that create new niche markets, as happened in

India, where a ban on camel milk was overturned after evidence showed its medicinal value (23, 24).

In some cases, pastoral livestock breeds produce unique goods due to their adaptation to their rangeland environment. These can include coloured wool or patterned hides, extra-fine fibre, or meat and milk with special flavours. A well-known example is the production of cashmere fibre from goats in Central Asia. Other examples include the production of naturally coloured wool from a number of indigenous sheep breeds, including the Deccani sheep in India and Linca sheep in Argentina. Pastoralists also frequently capitalise on their indigenous processing techniques and sell cultural handicrafts or garments. There are numerous examples of pastorally produced meat commanding niche markets or premium prices, including in South Africa (Umzimvubu goats) and Argentina (Criollo goats).

Niche marketing of pastoral products can involve establishing new markets or tapping into existing markets or, in some cases, creating an entirely new product. Developing appropriate value chains demands specialist skills and often requires significant support for local producers and their marketing associations in order to produce goods of the desired quality and consistency, at a realistic price and with consistency of supply (particularly in the case of fresh foods such as milk). Major efforts are also needed to promote and brand these products for the right consumer groups, particularly if foreign markets are to be targeted, and this may entail significant market research as well as developing marketing skills.

### **Incentivising the non-livestock services of pastoralism**

It is increasingly recognised that pastoralism is a dual system of livestock production and environmental stewardship and that the secret to sustainable pastoralist development is to incentivise the ecosystem services that are supported by pastoral stewardship. Pastoralists in many countries have already begun to participate in pay-for-performance schemes that can ensure that they are able to continue using management practices that secure environmental services (1). It may not be necessary to incentivise each and every ecosystem service but a number of examples of environmental incentives can be identified, including payments for the protection of water sheds, incentives for the conservation of biodiversity, public payments for fire and avalanche management, and incentives to protect pastoral landscapes.

### **Markets for biodiversity**

Pastoralists can benefit from both the consumptive and the non-consumptive use of biodiversity. The consumptive

use of biodiversity includes the sale of natural products, such as medicinal or cosmetic plants, as well as the sale of hunting concessions. Under sustainable conditions, pastoralism maintains biologically diverse rangelands that produce numerous high-value natural products, demand for which has increased in the global marketplace. For example, gum arabic (derived from the sap of *Acacia senegal* and also known as acacia gum), is in high demand for its use in industrial applications, such as confectionery, pharmaceuticals, cosmetics and chemical applications. Consumptive use requires careful regulation to ensure quotas are set for sustainable extraction and there are fears in many countries that the prevailing weakness in tenure and governance could jeopardise sustainable use. Non-consumptive use is therefore more appealing to many in the environmental sector and includes various means of capturing the benefits from recreation. Many European pastoralists, for example, derive secondary income from tourist visits and home stays, or through payments from a tourism tax that is designed to incentivise the maintenance of attractive landscapes (25). Growing recognition of the compatibility between pastoral land use and conservation objectives at the landscape level has created opportunities for herders to benefit from a growing 'willingness to pay' for the biodiversity conservation values associated with extensive pastoralism. In East Africa, for instance, many initiatives have promoted wildlife-based tourism as a means to create meaningful incomes for poor pastoralists and ensure conservation outcomes and continued co-benefits on open rangelands (26). Household surveys among Maasai pastoralists found that two-thirds (64%) of households living adjacent to the Maasai Mara National Reserve earn some income from wildlife, with wildlife conservation accounting for an average 21% of annual household income (27).

### **Payments for ecosystem services**

Payments for ecosystem services (PES) schemes have been frequently mooted but are less widespread in practice (28). PES works on the principle that beneficiaries of ecosystem services should pay for their upkeep or protection, usually through tariffs levied by public institutions. For example, a PES scheme has been proposed to protect pastoral management of the Upper Tuul catchment, which supplies water to Ulaanbaatar, after research showed that degradation of these rangelands will cost the Mongolian economy a total of US \$338 million over the next 25 years (29).

European pastoralists receive PES under the Common Agricultural Policy and the Natura2000 Programme, established under the European Union 1992 Habitats Directive. Natura2000 includes many landscapes where grazing by pastoralists is vital for biodiversity conservation and ecosystem services. Payments are also made to Swiss shepherds to graze alpine pastures and thereby control

avalanche risks, to British shepherds for maintenance of a landscape's aesthetic appeal or for maintaining access through grazing, and to French and Spanish shepherds for fire control in Mediterranean woodlands. Shepherds in Andalusia, Spain, have been paid €40 to €90 per hectare per year under a performance-based, fire-break grazing scheme financed by the regional government (30).

Whilst Natura2000 and similar schemes at the sub-national level are designed to protect pastoralism as an essential component of landscape management and biodiversity conservation, other schemes look to support the conservation of biodiversity outside these protected areas. These include Community Conservation Agreements, signed between protected area authorities and adjacent rangeland managers, with performance-related payments for conservation outcomes. In Kenya, for example, the Amboseli National Park requires neighbouring Maasai land for wildlife dispersal, and leasing agreements have been used to maintain suitable habitats and to discourage fencing of land that would block migratory corridors (1).

### Carbon sequestration

Carbon sequestration and climate change mitigation is a very specific ecosystem service that has been widely heralded, but forms of payment for it have not made much progress in pastoral lands in the developing world, largely due to institutional and capacity weaknesses. Soil carbon management presents the most cost-effective climate change mitigation option (31) and rangelands are an obvious target, considering their scale. Rangelands occupy about 50% of the world's land area (32) and at least 25% of the world's land area remains under the management of pastoralists (25). These lands store approximately 34% of the global stock of CO<sub>2</sub> and improved rangeland management could potentially sequester 1,300–2,000 million metric tons of carbon dioxide equivalent (MtCO<sub>2</sub>e) by 2030 (33). Currently, grazing-related rangeland management activities are not eligible under most compliance markets, but efforts have been made to develop voluntary markets, with growing interest among some private companies and carbon funds. In 2011, a voluntary market methodology for grassland carbon was submitted by the Food and Agriculture Organization of the United Nations for approval under the Voluntary Carbon Standard (1).

### Risks and safeguards in developing markets for pastoral diversity

The title of this section emphasises the importance of equity in the development of markets, but in practice there are many obstacles to achieving equitable development outcomes and many risks that need to be mitigated. Pastoralists have been historically disadvantaged in terms of access to relevant and appropriate markets, so improving market access can contribute to greater equity between

them and the rest of society. However, at the same time, there is a risk that increasing overall equity (between pastoralists and non-pastoralists) can come at the cost of greater internal inequity (e.g. between pastoralist men and women). This can happen, for example, when products are traditionally controlled by women but where men dominate market transactions, and therefore men assume control of the products in response to better market access. The consequences of this change are often hard to predict, but can include weakening of social relations that were traditionally based on internal resource-sharing, and the degradation of natural resources, due to the breakdown of institutions that govern their use (34).

To mitigate such risks, we must pay explicit attention to the marketing opportunities and capabilities of women, and market development should be based on a detailed understanding of the resources they manage and control, and their specific marketing constraints. This includes understanding social norms surrounding the trade of goods and services, such as taboos against the sale of certain products, and how these norms are changing over time. Market development therefore becomes integral to a deeper overall understanding of pastoral societies, and part of the negotiated development process. Costs and benefits need to be weighed carefully, e.g. to compare the advantage of maintaining historical patterns of mobility with the improved market access that can be associated with a degree of sedentarisation. Since there are costs associated with many development changes, it is important that pastoralists are enabled to make informed decisions and understand, collectively, the consequences of different actions (3).

When markets develop it is common to find individuals within society who benefit to a significantly greater extent than others. Many pastoral societies are confronted with the emergence of powerful individuals with vast herds and unprecedented levels of influence and wealth. In many cases, these individuals are absent from the rangelands, yet maintain a level of control over resource use that can be exercised from a distance, leading to misuse of rangelands. This has been observed in northern and western Africa, where herds are moved according to marketing opportunities rather than resource availability, leading to serious environmental degradation (3).

The risk of individuals taking control of resources and exploiting market opportunities to the detriment of others may be reduced, to some extent, through improved security of natural resource rights. As discussed earlier, improved governance of the rangelands through increased local accountability and better decision-making can empower pastoralists to resist misuse of their land and enforce management plans. In practice, market development and securing resource rights may go hand in hand, since improved marketing opportunities are often used as an



economic incentive to strengthen governance and secure tenure, whilst stronger tenure is a necessary safeguard against economic injustice (35).

As alluded to above, cultural norms can be a constraint to market engagement, but market engagement can also be a powerful influence over cultural norms. Most pastoralists are very used to marketing certain livestock or products, but many societies also place taboos on the sale of certain goods, such as camel milk or young female stock. Often this is because those goods have a particularly high value in internal exchanges and cementing social relations. Nevertheless, as market opportunities emerge, such taboos can disappear. Rapid changes in access to markets and to property rights may create an unprecedented pace and scale of economic change that can be harmful to societal cohesion. A central tenet of good governance is the principle of free, prior and informed consent which should be closely adhered to in the development of pastoralist markets, in order to help pastoral communities make informed choices over if and how they engage in markets.

## Conclusion

The past decade has seen major progress in broadening the perspective of pastoralism away from local, culturally specific definitions towards a recognition that pastoralism is a common response worldwide to certain common ecological factors. As a result of this broadening of perspectives, patterns have emerged that inform a new

vision for the future of pastoralism – a vision based on optimising the production of ecosystem services through extensive livestock production.

This paper provides a very cursory examination of some important elements that must be addressed to move towards this vision. However, there is a growing body of evidence supporting this approach to pastoralist development. The wide array of examples that can be found should not necessarily be adopted as blueprints, but they provide inspiration and demonstrate that pastoralism has an important future in our transition to a sustainable global economy. Moving towards this future nevertheless requires a major overhaul of the way we approach pastoralist development and major investment in the people who are central to the system. As long as pastoralists remain marginalised, with weak rights and poor access to services, their future will remain uncertain.

In this vision of the future, pastoralism remains fundamentally a livestock economy. Nonetheless, we must reappraise what we mean by intensification and development. Livestock productivity can be greatly increased in many countries, but the objective is not to maximise this one ecosystem service at the expense of all others. An overall policy agenda must be established to guide pastoralist development across multiple sectors towards more equitable and more environmentally sustainable solutions. ■

## Pour un pastoralisme durable : optimisation de la production animale et de la gestion des prairies au moyen de politiques et d'investissements appropriés

R. Ouedraogo & J. Davies

### Résumé

Le pastoralisme est un système de gestion dynamique du bétail et des terres qui génère des bénéfices économiques, sociaux et environnementaux. Dans une large mesure, le pastoralisme est le fruit d'une adaptation à la variabilité écologique et climatique ; de ce fait, il n'est pas simplement un système de production animale mais fournit d'importants services écologiques à l'humanité. Des données probantes obtenues dans plusieurs contextes nationaux montrent que l'évolution durable du pastoralisme passe par la prise en compte de la double fonction environnementale et économique du pastoralisme et par une adaptation des politiques et des investissements afin de soutenir chacune de ces fonctions. Les auteurs de cet article examinent trois facteurs éprouvés qui contribuent de manière déterminante au développement durable du pastoralisme

et à l'optimisation des liens entre la production animale et la gestion de l'environnement : le renforcement des capacités et des institutions pastorales; la protection de la jouissance des terres et la gouvernance des ressources naturelles; la garantie de marchés équitables tenant compte de la diversité pastorale.

Pour apporter un véritable soutien à cette double fonction économique et environnementale du pastoralisme, il convient non seulement d'optimiser la production de services écosystémiques grâce à l'élevage extensif, mais aussi de procéder à une refonte majeure de notre approche du développement pastoral et d'investir massivement dans les populations au cœur de ce système. Tant que les pasteurs demeureront marginalisés, dotés de peu de droits et d'un accès limité aux services, leur avenir restera incertain.

#### **Mots-clés**

Capacités pastorales – Diversité pastorale – Gouvernance des prairies – Jouissance des terres – Pastoralisme – Pastoralisme durable – Production animale extensive.



## **Políticas e inversiones que optimizan la producción ganadera y la administración de los pastizales para posibilitar un pastoreo sostenible**

R. Ouedraogo & J. Davies

#### **Resumen**

El pastoreo es un sistema que reposa en una gestión dinámica del ganado y las tierras para obtener un beneficio económico, social y ambiental. Lejos de ser un mero sistema de producción ganadera, constituye en gran medida una adaptación a la variabilidad ecológica y climática que presta a la humanidad importantes servicios ambientales. Los datos empíricos obtenidos en muy distintos contextos nacionales demuestran que el desarrollo sostenible del pastoreo pasa por entender su doble función, a la vez ambiental y económica, y por adaptar políticas e inversiones que vayan en apoyo de ambas dimensiones. Los autores examinan tres líneas básicas de trabajo que, según se ha comprobado, son cruciales para el desarrollo sostenible del pastoreo y para lograr que, en la mayor medida posible, producción ganadera y administración del medio ambiente vayan de la mano: reforzar las instituciones y capacidades pastorales; asegurar la propiedad de la tierra y la buena administración de los recursos naturales; y proporcionar mercados equitativos para la diversidad pastoral.

Para respaldar eficazmente la doble función (económica y ambiental) del pastoreo es preciso no solo optimizar la producción de los servicios ecosistémicos mediante una producción ganadera extensiva, sino también reconsiderar a fondo la manera en que entendemos el desarrollo del pastoreo e invertir cuantiosamente en las personas que constituyen el núcleo del sistema. Mientras las sociedades pastorales sigan estando relegadas, disfruten de derechos endebles y gocen de un acceso deficiente a los servicios, su futuro seguirá rodeado de incertidumbre.

#### **Palabras clave**

Administración de los pastizales – Capacidades pastorales – Diversidad pastoral – Pastoreo – Pastoreo sostenible – Producción ganadera extensiva – Propiedad de la tierra.



## References

- McGahey D., Davies J., Hagelberg N. & Ouedraogo R. (2014). – Pastoralism and the Green Economy: a natural nexus? United Nations Environment Programme (UNEP) & International Union for Conservation of Nature (IUCN), Nairobi, 58 pp. Available at: <https://portals.iucn.org/library/sites/library/files/documents/2014-034.pdf> (accessed on 28 September 2015).
- Myint M.M. & Westerberg V. (2014). – An economic valuation of a large-scale rangeland restoration project through the Hima system in Jordan. Report for the Economics of Land Degradation (ELD) Initiative by the International Union for Conservation of Nature, Nairobi. Available at: [http://cmsdata.iucn.org/downloads/eld\\_iucn\\_case\\_study\\_jordan\\_\\_web\\_.pdf](http://cmsdata.iucn.org/downloads/eld_iucn_case_study_jordan__web_.pdf) (accessed on 16 February 2016).
- Davies J. & Hatfield R. (2008). – The economics of mobile pastoralism: a global summary. *Nomad. Peoples*, **11** (1), 91–116. doi:10.3167/np.2007.110106.
- Hesse C. & MacGregor J. (2006). – Pastoralism: drylands' invisible asset: developing a framework for assessing the value of pastoralism in East Africa. IIED Issues Paper 142. International Institute for Environment and Development (IIED), London. Available at: <http://pubs.iied.org/pdfs/12534IIED.pdf> (accessed on 28 September 2015).
- Rodriguez L. (2008). – A global perspective on the total economic value of pastoralism. Global synthesis report based on six country valuations. International Livestock Research Institute, Nairobi, 25 pp. Available at: [http://cmsdata.iucn.org/downloads/tev\\_report.pdf](http://cmsdata.iucn.org/downloads/tev_report.pdf) (accessed on 28 September 2015).
- Bonfoh B., Fokou G., Crump L., Zinsstag J. & Schelling E. (2016). – Institutional development and policy frameworks for pastoralism: from local to regional perspectives. In *The future of pastoralism* (J. Zinsstag, E. Schelling & B. Bonfoh, eds). *Rev. Sci. Tech. Off. Int. Epiz.*, **35** (2), 499–509. doi:10.20506/rst.35.2.2537.
- Food and Agriculture Organization of the United Nations (FAO) (2016). – Technical guide on pastoral lands: implementing the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the context of national food security (in press). FAO, Rome.
- Stern M.J. & Coleman K.J. (2015). – The multi-dimensionality of trust: applications in collaborative natural resource management. *Soc. Natur. Resourc.*, **28** (2), 117–132. doi:10.1080/08941920.2014.945062.
- Herrera P.M., Davies J. & Manzano P. (eds) (2014). – The governance of rangelands: collective action for sustainable pastoralism. Routledge, Abingdon, UK, 298 pp. Available at: [http://cmsdata.iucn.org/downloads/governance\\_book.pdf](http://cmsdata.iucn.org/downloads/governance_book.pdf) (accessed on 28 September 2015).
- Davies J. (2015). – Enabling governance for sustainable land management. In *Land restoration: reclaiming landscapes for a sustainable future* (I. Chabay, M. Frick & J. Helgeson, eds). Academic Press, Elsevier, Cambridge, Massachusetts, 598 pp.
- Baival B. & Fernández-Giménez M.E. (2012). – Meaningful learning for resilience-building among Mongolian pastoralists. *Nomad. Peoples*, **16** (2), 53–77. doi:10.3167/np.2012.160205.
- Schelling E., Wyss K., Diguimbaye C., Béchir M., Taleb Moustapha O., Bonfoh B., Tanner M. & Zinsstag J. (2008). – Towards integrated and adapted health services for nomadic pastoralists. In *Handbook of transdisciplinary research* (G. Hirsch Hadorn, H. Hoffmann-Riem, S. Biber-Klemm, W. Grossenbacher-Mansuy, D. Joye, C. Pohl, U. Wiesmann & E. Zemp, eds). Springer, Heidelberg, Germany, 277–291. doi:10.1007/978-1-4020-6699-3\_17.
- Tompkins E.L. & Hurlston L.A. (2011). – Public-private partnerships in the provision of environmental governance: a case of disaster management. In *Adapting institutions: governance, complexity and social ecological resilience* (E. Boyd & C. Folk, eds). Cambridge University Press, Cambridge. doi:10.1017/CBO9781139017237.012.
- International Union for Conservation of Nature (IUCN) (2011). – The land we graze: a synthesis of case studies about how pastoralists' organizations defend their land rights. IUCN, Nairobi, 48 pp. Available at: [http://cmsdata.iucn.org/downloads/land\\_rights\\_publication\\_english\\_web.pdf](http://cmsdata.iucn.org/downloads/land_rights_publication_english_web.pdf) (accessed on 28 September 2015).
- Scoones I. (1995). – Living with uncertainty: new directions for pastoral development in Africa. Intermediate Technology Development Group Publications, London. doi:10.3362/9781780445335.
- Aredo D. (2004). – Fuzzy access rights in pastoral economies: case studies from Ethiopia. In *The commons in an age of global transition: challenges, risks and opportunities*. Proc. 10th Conference of the International Association for the Study of Common Property (IASCP), 9–13 August, Oaxaca, Mexico. Available at: <http://dlc.dlib.indiana.edu/dlc/handle/10535/733>.
- Cotula L. (ed.) (2007). – Changes in 'customary' land tenure systems in Africa. LSP Working Paper 38. Livelihood Support Programme (LSP), Food and Agriculture Organization of the United Nations, Rome, 102 pp. Available at: <http://pubs.iied.org/pdfs/12537IIED.pdf> (accessed on 28 September 2015).
- Food and Agriculture Organization of the United Nations (FAO) (2012). – Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security. Committee on World Food Security, FAO, Rome, 48 pp. Available at: [www.fao.org/docrep/meeting/025/md708e.pdf](http://www.fao.org/docrep/meeting/025/md708e.pdf) (accessed on 28 September 2015).
- De Groot R.S., Alkemade R., Braat L., Hein L. & Willemsen L. (2010). – Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecol. Complex.*, **7** (3), 260–272. doi:10.1016/j.ecocom.2009.10.006.

20. Bonfoh B., Wasem A., Traoré A.N., Fané A., Spillmann H. & Simbé C.F. (2003). – Microbiological quality of cows' milk taken at different intervals from the udder to the selling point in Bamako (Mali). *Food Control*, **14** (7), 495–500. doi:10.1016/S0956-7135(02)00109-3.
21. Rueff H. & Rahim I. (2016). – Enhancing the economic viability of pastoralism: the need to balance interventions. In *The future of pastoralism* (J. Zinsstag, E. Schelling & B. Bonfoh, eds). *Rev. Sci. Tech. Off. Int. Epiz.*, **35** (2), 577–586. doi:10.20506/rst.35.2.2542.
22. Bonfoh B., Ankers P., Sall A., Diabaté M., Tembely S., Farah Z., Alfaroukh I.O. & Zinsstag J. (2006). – Operational plan for services to small-scale milk producers in peri-urban Bamako (Mali) [in French]. *J. Sahelian Stud. Res.*, **12**, 7–25.
23. Al-Ayadhi L.Y. & Elamin N.E. (2013). – Camel milk as a potential therapy as an antioxidant in autism spectrum disorder (ASD). *Evidence-based Complement. Alternat. Med.*, **2013**, 602834. doi:10.1155/2013/602834.
24. Zibae S., Hosseini S.M., Yousefi M., Taghipour A., Kiani M.A. & Noras M.R. (2015). – Nutritional and therapeutic characteristics of camel milk in children: a systematic review. *Electron. Physician*, **7** (7), 1523–1528. doi:10.19082/1523.
25. Davies J., Niamir-Fuller M., Kerven K. & Bauer K. (2010). – Extensive livestock production in transition: the future of sustainable pastoralism. In *Livestock in a changing landscape: drivers, consequences, and responses* (H. Steinfeld, H.A. Mooney, F. Schneider & L.E. Neville, eds), Vol. I. Island Press, Washington, DC.
26. Notenbaert A., Davies J., De Leeuw J., Said M., Herrero M., Manzano P., Waithaka M., Aboud A. & Omondi S. (2012). – Policies in support of pastoralism and biodiversity in the heterogeneous drylands of East Africa. *Pastoralism: Res., Pol., Pract.*, **2**, 14. doi:10.1186/2041-7136-2-14.
27. Homewood K.M., Chenevix Trench P. & Brockington D. (2012). – Pastoralism and conservation: who benefits? In *Linking biodiversity conservation and poverty reduction* (D. Roe, M. Walpole, C. Sandbrook & J. Elliott, eds). Wiley-Blackwell, Hoboken, New Jersey.
28. Addison J. & Greiner R. (2015). – Applying the social-ecological systems framework to the evaluation and design of payment for ecosystem services schemes in the Eurasian steppe. *Biodiv. Conserv.*, **2015**, 1–20. doi:10.1007/s10531-015-1016-3.
29. Emerton L., Erdenesaikhan E., De Veen B., Tsogoo D., Janchivdorj L., Suvd P., Enkhtsetseg B., Gandolgor G., Dorisuren Ch., Sainbayar D. & Enkhbaatar A. (2009). – Mongolia. The economic value of the Upper Tuul ecosystem. Discussion Papers. East Asia and Pacific Sustainable Development Department, World Bank, Washington, DC, 108 pp. Available at: <http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/TuulMongolia111809.pdf> (accessed on 28 September 2015).
30. Mirazo J.R. (2012). – Wildfire prevention: a reason for promoting pastoralism in Spain. *La Canada, Newslett. EFNCP*, **28**, 6–7. Available at: [www.efncp.org/download/la-canada28.pdf](http://www.efncp.org/download/la-canada28.pdf) (accessed on 28 September 2015).
31. McKinsey & Co. (2009). – Pathways to a low-carbon economy: version 2 of the global greenhouse gas abatement cost curve. McKinsey & Co, London. Available at: [www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/pathways-to-a-low-carbon-economy](http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/pathways-to-a-low-carbon-economy) (accessed on 28 September 2015).
32. Friedel M.H., Laycock W.A. & Bastin G.N. (2000). – Assessing rangeland condition and trend. In *Field and laboratory methods for grassland and animal production research* (L. Mannelje & R.M. Jones, eds). CABI, Wallingford, UK, 227–262. doi:10.1079/9780851993515.0227.
33. Tennigkiet T. & Wilkes A. (2009). – An assessment of the potential of carbon finance in rangelands. ICRAF Working Paper 68. World Agroforestry Centre (ICRAF), Nairobi.
34. Flintan E. (2009). – Women's empowerment in pastoral societies. World Initiative for Sustainable Pastoralism, Nairobi/International Union for Conservation of Nature, Gland, Switzerland. Available at: [http://cmsdata.iucn.org/downloads/gender\\_format.pdf](http://cmsdata.iucn.org/downloads/gender_format.pdf) (accessed on 28 September 2015).
35. Haddad F. (2014). – Rangeland resource governance, Jordan. In *The governance of rangelands: collective action for sustainable pastoralism* (P.M. Herrera, J. Davies & P. Manzano, eds). Routledge, Abingdon, UK, 45–61. Available at: [http://cmsdata.iucn.org/downloads/governance\\_book.pdf](http://cmsdata.iucn.org/downloads/governance_book.pdf) (accessed on 28 September 2015).