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Policy drivers for rangelands in developing countries

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Key points : The most important land-use in rangelands is pastoralism . However , very few developing countries have functioning rangeland policies that promote sustainable pastoralism . The absence of such policies and of investment in rangelands , has resulted in environmental damage , poverty , and marginalization of pastoralists . Global demand for "clean" meat and livestock products is expected to skyrocket . Intensification of the livestock industry is therefore seen as a solution , but often happens at the expense of environmental and human health . The alternative , "extensification" , is not always possible in developing countries due to land shortages , but paradoxically it is a growing phenomenon in some developed countries . Rangeland policy should focus on land law , economic subsidization and taxation , public investment in infrastructure and access to local and global markets , provision of insurance , promotion of self-organization , and mobile services for pastoralists to adapt to current and future climate variability . In other words , a "green revolution" in rangelands will not be technology-driven but policy-driven .

Key words : pastoralism , intensification , extensification , investment , mobile services

Introduction

The curious thing about rangeland policy in developing countries is that very few countries have actually developed such policies . Jeremy Swift calls this "benign neglect" because governments pay more attention to the cropping sector than to livestock . Some countries still equate "modernity" with crop farming , not nomadic wanderers . There are far reaching changes and drivers of change occurring now and looming in the future that point to the fallacy of such benign or deliberate neglect . Careful attention needs to be paid to creating an environmentally sustainable livestock sector . The focus of this paper is only on rangeland policy in developing countries , but with increasing globalization , what happens outside of this sphere is just as important .

From the remote hill farms of Northern Europe to the hot lowlands of Sub Saharan Africa , extensive livestock production is central to the livelihoods of millions of the World 's rural inhabitants . Yak producers in Western China , alpaca farmers in Peru and camel herders in Somalia : all live in marginal lands where productive potential is relatively low and the climate is adverse . This commonality is neither an accident , nor an anomaly : extensive livestock production systems are uniquely adapted to such marginal environments and unpredictable weather , and they have been developed to harvest resources that are inaccessible to , or unsustainably used by other production systems . Many pastoral systems are oriented towards the production of multiple goods and services such as milk , hair , meat , blood , manure , transport , draft power , food storage , capital reserve and a hedge against inflation , drought and other risks (Niamir-Fuller 1999) .

Rangeland degradation is frequently blamed on livestock production . One estimate shows that 680 million ha - representing about 20 per cent of the world's pasture and rangelands - have been degraded (FAO/UNEP 2000) . Opinions over the role of livestock in land degradation are divided . Extensive livestock production (i.e. pastoralism) , is considered by some to be a principle cause of land degradation , and by others to be a solution . The different perspectives reflect deep misunderstandings of rangelands environments and pastoral production systems , as well as the competing interests of different resource users (Davies et al . in press) .

Drivers of change

Expansion of crops into rangelands The population of the world is increasing ; it is 6 .68 billion now and projected to be 8 billion in 2020 . Policies that support sedentarization , privatization of land , and expansion of cropping , without a counter-balancing series of policies on rangelands , are driving pastoralists out of their land and out of the livestock sector , resulting in major land conversion , closure of transhumance corridors , increasing degradation on remaining rangelands , all of which leave many dependent on food aid or feed supplements (Toulmin 2006) (Adams 1992 , Hawley 2003) (Dutilly-Diane et al . 2005) . Between the years 1700 and 1900 , cropland has increased from 3-4M ha to 1200M ha ; between 1900 and 2000 it grew by another 800M ha and now comprises 15 per cent of the planet 's land surface (Dent , 2006) . The Millennium Ecosystem Assessment reports that expansion of cropland into forests and pastures is the single most important factor in land degradation . The value to society of such conversion is questionable since it is also expected that crop yields in developing countries will continue to decline in the next 40 years by 50% . When the opportunity costs of cultivation are taken into consideration , crop production does not appear in such a favourable light as pastoralism in drylands . By contrast , in developed countries four fifths of the growth of the world 's grain harvest has come from raising land productivity , but much of this growth is dependent on oil (Brown , 2008) .

Examples of expansion of cropland into rangelands , and resulting loss of pastoral economy are widespread , including the Afar region of Ethiopia (Motzfeldt 2005) , Uganda 's Karimajong (Uganda Land Alliance 2004) , or the Kilimanjaro region of Kenya or among the Somalis where conversion of the scarce wetland systems (constituting only 2-3% of the landscape) undermines productivity of the livestock system on the remaining 97% of land area (Hatfield and Davies , 2006) (Adams et al . 2006) .

Kenya's Turkana have been similarly disadvantaged by the loss of key wetland pastures owing to the damming of the River Turkwel, leaving many of the community dependent on food aid (Adams 1992, Hawley 2003).

Under-investment in the pastoral sector World trade in livestock products is highly competitive and underinvestment in the sector leads to a loss of market share. There is a misperception that pastoralism does not produce significant economic values. Most studies on pastoral economics focus on productivity and commercial offtake, neglecting non-monetized products or services. Such standard valuations of communal livestock systems are often used to inform policy, but they miss three quarters of the direct and indirect use values from the sector (Davies, et al. in press). This then leads to the conclusion that extensive livestock systems are unproductive and less efficient than commercial systems, and governments then fail to make the necessary public investments in market infrastructure, roads, security, education and human and institutional capacity building (McPeak and Little 2006). The mobility and dispersion of pastoralists also means that standard techniques for provision of services are not suitable, but very few governments have invested in mobile services (e.g. paravets, mobile vet and health clinics, mobile schools, long distance learning, credit and insurance).

Ethiopia provides a striking example of underinvestment in the pastoralist sector. Livestock contribute more than 20% of Ethiopia's total GDP, and probably much more if other intermediate values of livestock are properly assessed, yet the Government allocated less than 0.3% of its recurrent expenditures on livestock between 1993 and 1999 (Aklilu 2002). Partly as a consequence of its failure to recognize the value of this production, smuggling of live animals, hides and skins from Ethiopia into neighboring countries is costing the treasury an estimated US \$100 million each year (BBC 2001).

Afghanistan's mechanized wool-washing facilities have deteriorated through neglect to the extent that the country's traditional carpets are increasingly manufactured from Australian wool imported via Pakistan. Mismanagement and low marketing expertise have also seen Afghanistan's Astrakhan pelt industry lose market share, from having dominated international markets in the 1950s (UNDP 2003a). In infrastructure-poor dryland areas, where the cost of procuring food can be prohibitive, even the opening of one or two roads can have a profound impact on livestock marketing, as in Pakistan (Ehlers and Kreutzman 2000) and Somalia (Nori et al. 2006).

The former Soviet Union provided an example of the returns to strong investment in the livestock sector. The Soviet administration transformed livestock production into a major contributor to the rural and national economies of Kazakhstan, Kyrgyzstan and Turkmenistan (Kerven et al. 1996). By the end of the Soviet era, Kazakhstan was producing 25% of the Soviet Union's lamb and a fifth of its wool, most of which came from pastoral areas (Diddy and Menegay 1997). Moreover, extensive grazing systems in the semi-arid regions of Kazakhstan, Uzbekistan and Turkmenistan were estimated to have 50% lower production costs than other, more intensive Soviet livestock systems (Kerven et al. 1996).

Cross-border trade restrictions Many pastoral areas span international boundaries and therefore cross-border trade is common. However, rather than facilitating this trade to stimulate local economies, and investing in those economies, some governments impose tariffs and restrictions that effectively ensure the trade remains in the informal sector, is characterized as "smuggling", and is forced to resort to bribes at border posts where necessary (McPeak and Little 2006) (Little and Mahmoud 2005).

Cross-border trade is common in Central Asia where yaks and cattle are driven across from Tajikistan to the urban markets of southern Kyrgyzstan, sheep from western Kyrgyzstan supply the populous Ferghana valley of Uzbekistan, horses are trekked across the mountains of northern Kyrgyzstan for sale in the richer communities of south Kazakhstan, cashmere goat fiber is trucked over the borders of eastern Kazakhstan and Kyrgyzstan to China, meat from northern Kazakhstan goes to Russia, and karakul lamb pelts are sold without state permission from Turkmenistan to Russia. Nevertheless, as a result of such trade, legal and illegal, the true value of livestock exports to Central Asian countries and their populations has not been computed (Kerven, 2006).

Livestock marketing in pastoral regions is complicated by transaction costs arising from the long distances that the pastoralist must travel and the poor infrastructure generally found in the marketplace (Scoones 1995) (Drabenstott 1995). Considering the demand for livestock produce from North African markets, opportunities to increase livestock trade from Sub-Saharan Africa should be great. However, further export growth to North African states is constrained by tight import regulations: by high import tariffs in Morocco (around 25%), by the influence exerted by large, wholesale butchering companies in Algeria and by State institutions in Tunisia that have been set up to avoid price explosions during religious festivals. Moreover, in Morocco and Algeria the market for red meat is tightly controlled by urban herders owning large flocks (Alary and El Mourid 2005).

Intensification or extensification World meat consumption is growing twice as fast as the global population, and there is a close correlation between income and meat consumption. As Lester Brown so aptly says, the world has no experience in feeding some 5 billion people striving to move up the food chain (Brown 2008). Globally, livestock is becoming agriculture's most important sub-sector in supplying commodities to growing markets and pastoralists living on extensive rangelands are in a position to play a major role in satisfying this burgeoning demand, particularly in supplying the demand for dairy products. However, much of the current global production growth is linked to intensification of production because of the easier access to markets and

comparative ease of overcoming trade restrictions . Today , 37% of wheat produced is used to feed animals in intensive systems (Brown , 2008) .

The process of intensification in many countries has entailed fencing of communal pastures , trucking of stock to distant pasture , or water to stock , all of which has resulted in land degradation (Niamir Fuller 1999 , Sidahmed , et .al . 2000 , Zhaoli et al . 2005 , Bauer 2004) . The LEAD programme chronicled a litany of negative environmental effects as a result of intensification of the livestock sector . There are increasingly strident voices against intensive livestock production from diverse corners such as animal rights activists , and those concerned with obesity issues , mad cow disease , avian flu and other unintended effects of intensification . They have now been joined by those concerned with the relatively high carbon footprint of intensive livestock production . In the USA , a meat-based diet has roughly the same carbon footprint (in terms of energy used) as personal transportation (Brown 2008 quoting Eshel and Martin) .

What is needed is greater attention to extensive livestock production as a counter balance to the intensive livestock sector . Growth in the intensive sector is inevitable , particularly since the conditions for investment are often better . However , the case has been well made that returns to investment in extensive systems can be significant and it is not necessarily a poor relative of the intensive sector . At the same time , there are many positive environmental externalities of extensive livestock production , which means replacing it , intensifying it or removing it comes at a great environmental cost . However , if these environmental services are compensated , extensive systems will be made more competitive and more resilient . If the global concerns about climate change eventually result in greater penalties for pollution in agricultural systems then extensive livestock production will receive a further boost to its competitiveness , and if global trade disincentives that favor intensive systems are relaxed the gains for extensive production may be yet greater .

Pastoralists are increasingly contributing to their national economies , in addition to satisfying their subsistence needs . Syria s pastoralists , for example , are almost self-sufficient in terms of daily food , yet they supply the urban areas with a large part of their livestock produce requirement . Pastoralism contributes 8 1/2% of Uganda s GDP , over 10% in Ethiopia and around a third of Mongolia s GDP . Rapid urban growth is generating an accelerating growth in demand for animal products , which is behind the policy of increasing offtake from the country s pastoral systems in the Andes (Leon-Velarde et al . 2000) . In Turkmenistan and Kazakhstan s the rising demand for meat and dairy produce has greatly increased household incomes (World Bank 2005) . However , in many countries where land is in acute shortage , pressure over pastoral resources is intense , and whilst open rangelands may often be unsuitable for crop cultivation , there are pockets of cultivable land within the rangelands that often make the wider (agro)pastoral system viable (Norton-Griffiths , et al . 2006) .

Globalization In general , globalization of trade has negatively impacted pastoral producers in developing countries , particularly as pastoralists from countries with stronger economies take a greater market share and produce a greater diversity of pastoral products . Wool producers in India s Rajasthan region , or Syria s Awassi , struggle to compete against imports from Australia and Canada . Australian wool has also replaced local supplies in Afghanistan s famous carpet manufacturing industry (FAO 2001) . By contrast , important global markets exist for specialist and niche products from rangelands . Examples include Alpaca fiber from the Andean region , Astrakhan (karakul) lamb pelts that have traditionally been produced in desert pastoral systems of Central Asia , and cashmere , which is predominantly produced by pastoralists in China , Mongolia , and Afghanistan . China has become the world s leading cashmere producer with around half of the world market share (Kerven et al . 2005) .

With the growth in the organic agriculture movement , civil society movements such as the Via Campesina (www.viacampesina.org) , and the Slow Food Movement (www.slowfood.com) have gained ground . The Terra Madre experience shows that the appreciation of extensive livestock and pastoral animal products is on the rise (www.terramadre2006.org) . The demand for organic meat , coupled with increasing market interest for "exotic" or "healthy" products are helping to fuel a greater demand for pastoral products . The global market for camel milk alone is estimated at US \$10 billion , with the vast majority of the production taking place in the drylands (FAO 2006) . In Africa s two pastoralist-dominated countries-Mauritania and Somalia-commercial milk collection from nomadic producers has become routine (Nori et al . 2006 , Tiviski 2006) .

The food safety standards , which are there to meet threats (e.g . mad cow disease) that originate in very intensive livestock production systems , are applied indiscriminately to extensive livestock as well . The real , inflation-adjusted price for beef has remained stable in European markets for the past three or four decades , whilst the cost of meeting sanitary and phytosanitary standards has greatly increased as a consequence of European consumer concerns over food safety (Perry et al . 2005) . Development of refined standards specifically for extensive systems should be a priority and would help to reduce the production costs of pastoralists .

Effects of climate change Climate change will be felt differently depending on where you are and what you do , and opinions over what the future holds for the world s pastoralists are polarised . Some experts believe that pastoralists will be the first to feel the effects of climate change , whilst others consider pastoralism to be an adaptation to climate change and therefore amongst the best equipped to deal with it (Nori & Davies , 2007) . However , the latter also acknowledge that in many parts of the world , pastoralism has largely lost its adaptability , with literally less and less space to manoeuvre in order to accommodate

unpredictable weather patterns, and therefore increasing vulnerability to climate change, as well as restrictions to other strategies and to the customary institutions that enable reactive management and resilience.

One report on the Sahel predicts that there may in fact be a short term period of wetter climate for the Sahel, and that this might even last 20-30 years. However, the report further predicts that the system will once again become drier after that. The implication of such wide swings in climate change on land use can only be surmised. It is highly likely, given this scenario, that farmers will once again push northwards into a greener Sahel, only to be hit again after 1-2 generations with devastating droughts. In the meantime, pastoralists will have been squeezed onto the margins of the Sahara and therefore be even more affected (Brooks, 2005).

Changing paradigms Advances in range science hold potential as future drivers of change (e.g. Behnke and Abel 1996). However, it has been difficult to translate these concepts into policy change that favors pastoralism. Another paradigm shift is that there is increasing interest to invest in rangelands not only for "sustainable meat", but also for sequestration of carbon, biofuels, and other forms of diversifying income from rangelands. In fact, with current market failures described above, it may well be that the investment required to rehabilitate degraded rangelands can only be financially viable if it is accompanied by alternative income sources (Niamir-Fuller, 2007). However, the risk that such new enterprises will once again displace pastoralists is very high (e.g. as can be seen with mono-culture of biofuels on India's "wastelands"), unless policy measures protect land-user rights and promote such enterprises as alternative income generation.

New policy environment in developed countries Rangeland policy in developing countries has long been influenced by paradigms and policies in developed countries. However, many European countries are now enacting policies that support extensive production of livestock. Already changes in government policy towards pastoralism and extensive livestock production in Europe have made an impact. The European Council Regulation 1698/2005 outlines support for protection of the environment and the countryside through appropriate land management, and emphasizes the preservation and development of high nature value farming systems (which includes mountain pastoralism) as one of the priority areas of Rural Development (European Union, 2005). In Spain, an Act of Parliament passed in 1995 legitimizes the country's 120,000 kilometers of cañadas, or transhumance corridors, to ensure that pastoral flocks continue their transhumance and in so doing, continue to preserve the country's biodiversity (Jefatura del Estado, 1995).

In the 1990s, following a policy of supporting mountain systems and high nature value farming systems, Switzerland passed a law that decoupled direct payments from production indices and linked them to ecological services. For example, pastoralists were compensated for feeding animals on "coarse fodder" (mountain pastures) in recognition that they were of lower feed value and that transhumance require more labor investments. The benefit expected from reviving the use of mountain pastures were: greater biological diversity (particularly birds) and prevention of bush encroachment and fire hazards (EFNCP 2007).

Land tenure and self-organization In recent years, the adoption by most developing nations of principles such as land tenure reform, decentralization, devolution and democracy has increased the security of access among some mobile populations to land, resources and services. Statutory recognition of common property arrangements is now found in countries such as Scotland and Uganda (Fuys et al. 2007). In Bolivia, where indigenous people constitute over half the rural population, a new land law in 1996 creates the concept of Community Lands of Origin and enables the restitution of large territories in favor of original inhabitants (Kay and Urioste 2005). Similar trends are happening in Senegal (Ly and Niamir-Fuller 2005), and introduction of "pastoral codes" in Mauritania, Mali and Guinea (which however could have been improved with better consultation with pastoralists) (Hesse and Thébaud 2006). China's national grasslands law now allow for communal control of pastures by village-level groups (Banks et al. 2003).

As development planners have begun to acknowledge the role of traditional knowledge and customary institutions, and as they have accommodated more participatory and empowering approaches to development, they are opening the door for the self-organization of pastoralists. This is complemented by the steady increase in the total number of educated pastoralists, and the increased access to democratic institutions, associated for example with decentralization (Lister, 2004). Such processes are crucial, because in many countries, pastoralists are unaware of prevailing legal procedures and they lack understanding of their rights and responsibilities as citizens (Bonfiglioli 1992). However, such awareness has to be accompanied by political commitment. For example, despite the Ethiopian Government's efforts to develop ethnic federalism, and the presence of a Standing Committee on Pastoralist Affairs in the Parliament, pastoralist politicians in the region have not been able to initiate a single piece of legislation of significant benefit to their constituents (Markakis 2004).

Conclusions The marginalisation of pastoralist communities manifests itself in diverse ways, from the weak availability of data on pastoral areas, and concomitant weaknesses in understanding pastoralism, to the low degree of consultation with pastoralists in development planning and investment. Rangeland areas often lag behind national development in terms of literacy rates or health conditions, and the inhabitants have been ill-equipped to adapt to emerging trends, such as economic transformations, globalization, democratization, and climate change. Pastoralists often remain excluded from policy making, or represented by individuals with inadequate understanding of the pastoral reality.

Evidence shows that pastoralism is economically viable and is modernizing, but its growth and viability is constrained in some countries by inadequately designed and inappropriately chosen policies that have sought to transform, rather than enhance it. There is promising change in European countries towards support to transhumance and animal mobility. Extensive livestock production systems have a role to play in satisfying the burgeoning global demand for livestock produce. Promoting investments in this sector, including education, decentralization, financial services, and self-organization, would enable States to raise export earnings and reduce reliance on imports, whilst also reducing rural poverty.

The expected "green revolution" in the extensive livestock sector will not be technology driven. We are pressed to find technological fixes that are a quantum leap over traditional pastoralism. The focus of rangeland policy has to be on non-technological issues, such as land law and secure property rights, taxation and subsidization to be calculated on the basis of comprehensive economic valuation, public investment in infrastructure, provision of insurance, self-organization, and other means for pastoralists to adapt to current and future climate variability. The focus of our academic institutions therefore also has to turn towards such inter-disciplinary sciences.

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