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Competing Paradigms in Pastoral Development? A Perspective from the Far North of Cameroon

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Summary. — The debate over the future and development of African pastoral systems is dominated by two paradigms that are considered mutually exclusive: the modernization and the mobility paradigm. However, an ethnographic study of a peri-urban pastoral system in the Far North Province of Cameroon shows that these paradigms need and should not be mutually exclusive. Peri-urban pastoralists combine intensive and extensive strategies to cope successfully with the disappearance of grazing lands in peri-urban areas. I discuss what the implications are of this autonomous development for pastoral development in Africa.

Key words — West Africa, Cameroon, development, pastoralism, intensification, mobility

1. INTRODUCTION

It is now more than 25 years since participants at the *Future of Pastoral Peoples* conference set priorities for development in order to halt the decline of pastoral systems and prevent further marginalization of its people (Galaty & Aronson, 1981). There was a strong feeling that pastoral development had failed and had even contributed to the demise of pastoral societies, in large part because of misunderstandings of pastoral societies and rangeland ecology (Galaty & Aronson, 1981; Goldschmidt, 1981). Because of these chronic failures, major funding agencies like the World Bank and USAID retreated from pastoral development in the 1980s (de Haan, 1994, see also Poul Sihm's comments in the same issue; Oxby, 1999, p. 230; Pratt, Le Gall, & de Haan, 1997). Around the same time, a paradigmatic shift has taken place in the study of pastoral systems that led to a much greater understanding of pastoral systems and rangeland ecology, which is integrated in the theoretical framework of the new range ecology (Behnke, Scoones, & Kerven, 1993; Niamir-Fuller, 1999; Scoones, 1995). The new range ecology is currently the dominant theoretical paradigm in the study of pastoral systems and it guides the thinking of policy makers and practitioners in pastoral development (e.g., Pratt *et al.*, 1997). But despite a clear consensus and greater understanding of the social and ecological dynamics of pastoral systems, there is no agreement about how to develop African pastoral systems, as some argue that there is simply no space and thus no future for pastoral systems because of population growth and competition for scarce resources in Africa's drylands (e.g., Mortimore & Adams, 1998; Tiffen, 2004).

And so the current debate about the future of pastoral systems and pastoral development in Africa is dominated by two overarching paradigms, which I label here the *mobility paradigm* and the *modernization paradigm*, respectively (see also Fratkin, 1997, pp. 252–253). The mobility paradigm posits that extensive pastoralism is the most efficient adaptation to the drylands of Africa, and that pastoral rights to

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resources need to be protected in order to support pastoralists' mobility (e.g., Fratkin, 1997; Hogg, 1992; Niamir-Fuller, 1999; Scoones, 1995). The modernization paradigm posits that there is no future for traditional extensive pastoral systems and argues for intensification of animal husbandry and its integration in agricultural systems (e.g., Bourn & Wint, 1994; McIntire, Bourzat, & Pingali, 1992; Mortimore & Adams, 1998; Mortimore & Turner, 1991; Steen, 1994; Williams, Hiernaux, & Fernández-Rivera, 1999). The disagreement centers on what the implications are of the pressures on rangelands; one of the main threats to the sustainability of African pastoral systems (Fratkin, 1997; Niamir-Fuller, 1999), particularly in the Sudan–Sahelian zone, where agriculturalists and pastoralists are in direct competition for scarce resources (Raynaut, 2001).

In this paper, I will discuss how peri-urban pastoralists in the Sudan–Sahelian zone have adapted to the disappearance of grazing lands, resulting from urbanization and expansion of agriculture, by combining intensive *and* extensive strategies. They provide thereby an empirical challenge to the current debate over pastoral development, which is dominated by the mutually exclusive paradigms of modernity and mobility that stress either intensive *or* extensive strategies. In this paper, I will discuss how peri-urban pastoralists in the Far North Province of Cameroon integrate these strategies in one production system to cope with the disappearance of rangelands and what the implications are for pastoral development.

2. TWO PASTORAL DEVELOPMENT PARADIGMS

Development of pastoral systems is critical not only for the millions of African pastoralists whose livelihoods directly depend on it, but also for rural and urban populations for whom it provides the main source of protein. Moreover, the export of livestock and livestock products makes a significant contribution to the national economy, even though it is not reflected in the GDP and other statistics. These statistics are notoriously inadequate, inaccurate, and unreliable in part because livestock trade is primarily an informal sector, though a very dynamic and profitable informal sector (Kerven, 1992). [1] Pastoral development is thus not only about local, but also about regional and national economic development, although this is often difficult to demonstrate (Hesse & MacGregor, 2006). A joint report of the International Food Policy Research Institute (IFPRI), Food and Agriculture Organization of the United Nations (FAO), and International Livestock Research Institute (ILRI) predicts a "livestock revolution" in the developing world in the next 20 years, driven by demand from consumers, which, according to the authors, requires informed and pro-active pastoral development policy rather than a *laissez faire* policy (Delgado, Rosegrant, Steinfeld, Ehui, & Courbois, 1999, p. 4; see also, Perry, Pratt, Sones, & Stevens, 2005). The big question is what direction this policy should take.

In the past, many development projects failed miserably, primarily because they were based on misunderstandings of pastoral societies and rangeland ecology (Baxter, 1991; Dyson-Hudson, 1985; Goldschmidt, 1981; Horowitz, 1986; Oxby, 1999; Pratt *et al*., 1997; Sandford, 1983; World Bank, 1985), including the mainstream view that pastoralists were responsible for overgrazing the range (Sandford, 1982). Hardin' tragedy of the commons (1968), which used a parable of individual ownership of livestock and communal use of grazing land to illustrate the problems of human population growth, played a key role in shaping the mainstream view (see, e.g., Lamprey, 1983). Consequently many pastoral development projects were not aimed at developing pastoral systems but at minimizing their impacts on the environment. In fact, most development projects were not aimed at the development of pastoral systems but had other objectives, such as (1) increasing dairy and beef production (focus on the national development rather than the development of pastoral systems); (2) protecting rangelands (focus on natural resources); (3) protecting wildlife (concern with wildlife); and (4) famine relief (concern with pastoral people but not with the development of their production system) (for review of changes in the pastoral development policies see de Haan, 1994; Dyson-Hudson, 1985; Oxby, 1999). And, unfortunately, the projects and technical interventions that were aimed at the development of pastoral systems themselves, for example, through the construction of wells and provision of veterinary services, were a mixed blessing because they frequently had detrimental outcomes, such as increasing pressure on rangelands and overgrazing of pastures surrounding the wells. And, again, this was in part

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due to the misunderstandings of pastoral systems.

There is now a greater understanding of pastoral systems, which is widely shared by both social and natural scientists studying pastoral systems (Behnke *et al*., 1993) and has been adopted by the World Bank and other development organizations (but see, Oxby, 1999, pp. 233–234; Pratt *et al*., 1997). This understanding has translated into focus on pastoral development, rather than livestock development, that is, a shift from livestock to livelihoods, which treats pastoralism as a complex, integrated system (Salih, 1991, pp. 37–39). This involves a shift away from a technical, sectoral approach to an integrated and coordinated approach with broader socioeconomic goals including education, health, resource management, tenure systems, marketing, and livestock productivity (Pratt *et al*., 1997).

But despite these shared understandings, there is no consensus about the future of pastoral systems in Africa as there is fundamental disagreement about the question whether there is any space for extensive pastoral systems due to increasing population growth and competition for land between agriculturalists and pastoralists. Consequently, two paradigms have emerged that outline contrasting visions for the future and development of pastoral systems, and one can find these two paradigms within one organization (compare, e.g., the World Bank reports of McIntire *et al*., 1992; Pratt *et al*., 1997) but also among scholars with extensive research experience among East African pastoralists (compare, e.g., the papers in Human Organization on sustainability of Maasai pastoral systems by Fratkin & Mearns, 2003; McCabe, 2003).

The debate between proponents of the two paradigms over the future of pastoral development is most relevant for African drylands where agriculture is a feasible option. In ecological settings where the possibilities for rainfed agriculture are limited (Ellis & Kathleen, 1994), the mobility paradigm is considered the most sustainable option (but see Sandford, 2006).

(a) *Mobility paradigm*

The aforementioned paradigmatic shift to the new range ecology is partly based on a number of longitudinal and interdisciplinary studies of pastoral systems in Africa, which showed that traditional pastoral systems were well adapted to the drylands (e.g., Coppock, 1994; Little & Leslie, 1999). These studies challenged conventional Clementsian succession models of rangeland vegetation and introduced new models that distinguish between rangelands in equilibrium and disequilibrium (Behnke *et al*., 1993; Ellis & Swift, 1988). Rangelands in disequilibrium are those arid rangelands with large annual fluctuations in rainfall, that is, with a coefficient of variation of more than 30%. In these rangelands it is impossible to discern the effect of livestock populations on rangelands because of high variability in rainfall. Consequently, it is unlikely that livestock populations will overgraze the range because primary production is primarily affected by rainfall and not by grazing. Moreover, in disequilibrial systems livestock populations crash regularly due to droughts and as a result they remain well below carrying capacity (Little & Leslie, 1999). In equilibrial systems, on the other hand, vegetation change is gradual and follows a more classic succession pattern, which means that overstocking will have a greater impact on the environment (Coppock, 1994). One of the main lessons of this paradigm for pastoral systems is that when rangeland productivity is primarily affected by rainfall, as it is in disequilibrial ecosystems, opportunistic grazing and stocking strategies are highly appropriate and effective ways to cope with a variable, unpredictable, and heterogeneous environment (Sandford, 1982). This means that traditional strategies of maximizing herd size and herd mobility are key adaptations in rangelands in disequilibrium.

Built on this understanding of pastoral systems is a new approach to pastoral development, which has been aptly labeled the mobility paradigm (Niamir-Fuller & Turner, 1999). This mobility paradigm "wants to ensure that the appropriate policies, legal mechanisms, and support systems are in place, in order to allow self-evolution of pastoralism towards an economically, socially, and environmentally sustainable livelihood system" (Niamir-Fuller & Turner, 1999, p. 31). This translates into the following foci in the development policies: (1) protect the remaining rangelands from encroachment by outsiders; (2) support management of these rangelands by local pastoral organizations; (3) support mobility and flexibility of pastoral households; (4) improve the marketing infrastructure or other structures so that pastoralists can destock and restock cattle to cope more effectively with droughts; and (5)

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focus on sustainable livelihoods (see chapters in Scoones, 1995). Overall, the goal is to support rather than to interfere with pastoral systems and their management of natural resources, which is based on the assumption that traditional extensive pastoral systems are well adapted to the African drylands (see also Hogg, 1992; Pratt *et al*., 1997). [2]

Proponents of the mobility paradigm are optimistic that the development of African pastoral systems can be successful if the lessons from the new ecology are incorporated in project development and implementation (Scoones, 1995). Proponents of the modernity paradigm, on the other hand, are more pessimistic about the future of African pastoral systems.

(b) *Modernization paradigm*

While pastoralism is the only means of sustaining human populations in drylands like the Turkana district in Northwest Kenya, this does not apply to all African drylands. In the semi-arid Sudan–Sahelian zone of West Africa, agriculture is a viable alternative and is in direct competition with pastoralism. It is in this zone, where population growth, agricultural expansion, and urbanization lead to unrelenting pressure on rangelands, that an extensive pastoral strategy is simply no longer an option according to the proponents of the modernization paradigm (e.g., Mortimore, 2000; Tiffen, 2004). Their argument is not that traditional pastoral systems are not well adapted to rangelands and they do not reject the theoretical framework of the mobility paradigm (see Mortimore, 1998). They simply argue that because of population pressures and agricultural expansion there will be no place for extensive pastoral systems in the near future. [3] And thus the only sustainable option for pastoralists is to intensify and integrate livestock production in mixed-farming systems (Mortimore, 2000; Mortimore & Adams, 1998; Tiffen, 2004).

The modernization paradigm is common in the literature on mixed-farming systems. The paradigm favors integration of crop and livestock production in farming systems; it involves diversification at the household level rather than specialization at the household level and diversification and integration at the regional level (e.g., Bourn & Wint, 1994; McIntire *et al*., 1992). The focus of proponents of the modernization paradigm is not the development of pastoral systems *per se*, but dryland development in general. Notwithstanding this focus, the proponents of the paradigm have much to say about pastoral development.

The mixed-farming model of Michael Mortimore and Mary Tiffen's Drylands Research group has been most explicit about the future of pastoral systems in African drylands (Mortimore, 2000; Tiffen, 2004). Their research challenges conventional Malthusian doom scenarios for African drylands by showing that population growth does not have to lead to environmental degradation (Tiffen, Gichuki, & Mortimore, 1994). On the contrary, they argue that two factors, population growth and market incorporation, are necessary conditions for sustainable development of African drylands. Mortimore, Tiffen, and their collaborators have shown, in their interdisciplinary and comparative research across Africa (Nigeria, Niger, Senegal, and Kenya) and longitudinal research in the Closed Settled Zone of Kano, Nigeria, and the Machakos District, Kenya, that African farmers have successfully adapted to increasing demographic pressures on natural resources (Mortimore, 2005). These adaptations have been successful in that they increased production while maintaining the natural resources. Farmers have done this by intensifying their production system, investing in water and soil conservation techniques, and integrating livestock in mixed-farming systems. The integration of livestock in intensive mixed-farming systems serves several purposes: the manure can be used as fertilizer, animals can be used for draught and transport; and animals can be marketed and the revenues can be re-invested in agriculture (Mortimore, 2005, p. 14). One of the factors contributing to the success was proximity to urban centers, which allowed farmers to market their products and offered non-farm incomes, the revenues of which could be invested in the farms.

But in their vision of sustainable dryland development there is no role for pastoral systems. Based on their studies of farming systems in northeastern Nigeria, Mortimore and Adams described the following scenario for pastoralism in West Africa. First, the appropriation of rangeland for cultivation and the subsequent declining availability of fallows cannot be stopped. Second, intensive crop–livestock integration will lead to higher livestock densities and greater competition for the available fallows. Third, livestock will increasingly become dependent on farm-produced fodder. Fourth, livestock producers without title to farmland

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will be denied the possibility of an intensification–integration trajectory and thus access to farm-produced fodder (Mortimore & Adams, 1998, pp. 269–272). The implications of this scenario for pastoral development are clear:

> "Development policy should run with the direction of change, if it is to stand any chance of success in the long term (Tiffen *et al.*, 1994). The argument we have tried to advance here is that such directions can be discerned from case studies, and the future of livestock producing systems rests with closer forms of integration with farming rather than with attempting to stop the inevitable" (Mortimore & Adams, 1998, p. 272).

Pastoralism may continue for several more decades in West Africa until rural populations have nibbled away "any land that has the potential for crop production" (Tiffen, 2004, p. 15). Tiffen notes that although there are some grazing reserves in Northern Nigeria, they do not protect grazing resources for pastoralists (as some of it is used for farming by pastoralists themselves). And so "It seems unlikely that grazing reserves provide a future for livestock in Nigeria. The more likely future scenario is of mixed farmers, some of whom will be ex-pastoralists, who combine crop production and livestock raising in an integrated system" (Tiffen, 2004, p. 15).

3. A PERI-URBAN PASTORAL SYSTEM IN THE FAR NORTH OF CAMEROON

The peri-urban pastoral system discussed below is in important ways similar to the mixed-farming systems in the Close-Settled Zone of Kano studied, described by Michael Mortimore and other researchers of the Drylands Research group. First, livestock is integrated in the agriculture system, for example, oxen are used as draught animals and manure is used to fertilize the fields. Second, revenues from cattle sales are invested in land, labor, and technology to increase agricultural output. Third, proximity to a city allows peri-urban pastoralists to earn off-farm income, which is also invested in the agricultural system. Finally, crop residues are a commodity and used as livestock feed. The main difference is that peri-urban pastoralists have not abandoned their pastoral system. Instead they have intensified their pastoral production system while they continue to rely on the extensive strategy of mobility. I will explain below how these two strategies are integrated in one pastoral system.

Data about the peri-urban pastoral system were collected in a comparative study of three pastoral systems (peri-urban, agro-pastoral, and nomadic) in the Far North of Cameroon in 2000–01 (Moritz, 2003). In this ethnographic study I conducted multiple household surveys, collecting demographic, agricultural, and consumption data. I also conducted herd surveys in which I collected financial, organizational, and property rights data.

(a) *Study area description*

The Far North Province of Cameroon has a semi-arid climate with one rainy season and a highly variable temporally and spatially rainfall pattern. During the eight-month dry season, cattle lose considerable weight and become more susceptible to diseases. Animal losses are the highest during this season. This bottleneck has been dubbed the dry season crunch. The primary goal of FulBe pastoralists is to overcome this dry season crunch. This is achieved through a focus on animal nutrition, in particular increasing weight in the rainy season, so that they have enough reserves to survive the long dry season, and preventing weight loss in the dry season (see Schareika, 2003). Traditionally, pastoralists prevented weight loss of their animals through transhumance, taking their animals to the rangelands with the highest quality and quantity of forage.

Two phytogeographic zones of vegetation characterize the province: Sudanian in the southern grades and Sahelian in the Logone floodplain. Although the Sahelian zone is characterized by lower rainfall and a shorter rainy season, the seasonal flooding of the Logone floodplain makes this zone one of the most important dry season grazing lands in the Chad Basin. Pastoralists from Cameroon and neighboring Nigeria and Niger trek each November to the Logone floodplain when the water retreats to exploit the excellent quantity and quality of the rangelands. At the start of the rainy season, the Cameroonian pastoralists return to the higher elevated dunes of the Diamaré, while pastoralists from neighboring countries return to their respective countries. The Diamaré plains and the Logone floodplain form complementary resources for pastoralists in the Far North; the former provide pastures in the rainy season, the latter in the dry season (Requier-Desjardins, 2001, p. 28).

The village of Wuro Badaberniwol is located about 10 km east of the center of Maroua, the

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provincial capital of the Far North province. In recent years, Wuro Badaberniwol has become incorporated in the conglomeration of Maroua, which has grown from approximately 50,000 to 400,000 inhabitants in the last 25 years. [4] Increasing urbanization has also led to an expansion of agriculture around Maroua as many urban dwellers continue to farm. Consequently, there are practically no rangelands in the immediate surroundings of the village. The grazing capacity, that is, the number of animals that can live off the forage available from March through June, is extremely low: 11 animals/day/100 ha *versus* 574 animals/day/100 ha in the Logone floodplain (Moritz, 2003, p. 191). Cattle in the peri-urban area simply cannot survive on the natural forage available.

Peri-urban pastoralists have adapted to the lack of natural forage in two ways. First, they entrust part of their animals, the bush herd, to nomadic pastoralists or salaried herders who are permanently on transhumance between the Logone floodplain and the Mindif–Moulvoudaye region. Second, they feed the animals remaining in the village herd cottonseed cakes, hulls, and sorghum stalks in the dry season to compensate for the lack of natural forage. In the rainy season, these animals are sent on a separate transhumance to the Mindif–Moulvoudaye region. Thus, peri-urban pastoralists pursue both intensive and extensive strategies to cope with the disappearance of grazing lands in the peri-urban area. [5]

(b) *Intensification*

The intensification of the peri-urban pastoral system described here started in the early 1980s but really took off in the early 1990s. [6] FulBe pastoralists in West Africa have supplemented natural forage with sorghum and millet stalks and cottonseed for centuries. And the use of cottonseed cakes is not limited to the Far North of Cameroon; its use is widespread today among FulBe agro-pastoralists in West Africa (see, e.g., Buhl, 1999). However, the recent increase in use and dependence on cottonseed cakes in the peri-urban area of Maroua is unprecedented. Although stalks continue to provide an important source of nutrition and roughage, cottonseed cakes and hulls are now the primary source of nutrients and roughage for cattle, such that they *substitute* rather than *supplement* natural forage.

Intensification refers here primarily to a transition from a pastoral production system that relies on free natural forage to a capital-intensive production system that relies on costly cottonseed cakes, cottonseed hulls, sorghum stalks, and other commoditized inputs. It is important to note that peri-urban pastoralists did *not* intensify their production system to increase the output per animal (i.e., milk yields or fertility rates) or in response to the greater demand for livestock product. The foremost goal of peri-urban pastoralists was to get their cattle through the dry season crunch; intensification is a response to the disappearance of rangelands. The majority of the peri-urban pastoralists fed their cattle enough cottonseed cakes to survive, and, as a result, their animals were not much fatter than the cattle in the other pastoral systems that I studied (Moritz, 2003).

Cottonseed cakes have been produced locally by Société de développement du coton du Cameroun (SODECOTON) since the late 1960s. SODECOTON, the fourth biggest business in Cameroon, is one of the most profitable partly state-owned businesses. Most cotton is processed in two factories in Maroua and Garoua. In addition to cotton fibers, the company produces cottonseed oil (*diamaor*, which is marketed locally for cooking) and animal feed: cottonseed cakes and hulls. Animal feed remains a minor activity and a source of income for SODECOTON; it accounts for only 2% of the total revenues. [7] But this industrially produced animal feed has become extremely important for pastoralists in the Far North. One indicator of the growing use of cottonseed cake among pastoralists is sales and revenues, which have increased almost exponentially over the last two decades (Moritz, 2003, p. 199). [8]

Cottonseed cakes and hulls were not widely used as animal feed in the Far North until the droughts of the early 1980s, when many pastoralists were exposed for the first time to their nutritional advantages. Earlier attempts of SODECOTON to persuade farmers and pastoralists to use cottonseed cakes for draught animals used for the cultivation of cotton had not met with great success. Until 1993, cottonseed cakes were exported to Scandinavia because of the lack of local demand, while hulls were dumped in the seasonal river just behind the Maroua refinery. Only in the 1990s did local demand for cakes and hulls begin to grow significantly. And in the long dry season of 2000–01, demand exceeded supply by far and pastoralists paid 7,500 FCFA ($10) for 60-kilogram sacks of cottonseed cakes and 2,000 FCFA ($2.60) for sacks of hulls to save

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their animals from starvation (Moritz, 2003, p. 209). The adoption of technology in a situation of diminishing resources closely follows the Boserupian model of agricultural intensification in that costly innovations were only adopted when there were no other options (Boserup, 1965).

(c) *Management of the village and bush herds*

The use of cottonseed cakes has radically altered the daily management of the family herd. Cattle are fed cottonseed cakes twice daily, once in the morning before they go to "pasture" and once in the evening upon return. Feeding cattle cottonseed cakes is very labor intensive because, in all but one pastoral household, cattle are fed individually, one-by-one, with enamelware bowls rather than a common trough. [9] In addition to one person feeding the animals, another person controls the waiting animals, which are eager to get their twice-daily ration. Depending on the number of animals, the feeding can take more than three hours a day. Because of these labor demands village herds are relatively small: 24 cattle on average. Finally, the purchase of cottonseed cakes, hulls, and sorghum stalks is time consuming and stressful because of unreliable and insufficient supplies.

In the dry season, cattle in the village get all their food in the form of cottonseed cakes and hulls. It is just for show that cattle go to pasture during the day. One old-salaried herder in the peri-urban village noted: *na'i damdamti non* "the cattle are just marching in the same spot [and do not graze at all]." In the rainy season and the harvest season, however, the labor demands of herding increase as peri-urban pastoralists sent their animals on rainy season transhumance to the Mindif–Moulvoudaye area where there are fewer fields and plenty of bush.

Because of the disappearance of pastures around the village, peri-urban pastoralists kept approximately 75% of their cattle permanently in the bush (Moritz, 2003, p. 222). Some entrusted their cattle to nomadic pastoralists in an institutionalized form of entrustment that involved the appointment of a guardian or *kalifa*, who is responsible for the cattle and supervises the herder (Moritz, 2003, p. 322). Other peri-urban pastoralists entrusted their cattle to herders that they hired and supervised themselves. The annual production costs of the bush herds were much lower than the village herds – 2,984 FCFA *versus* 12,371 FCFA per animal – and only slightly higher than those of nomadic herds: 2,344 FCFA (Moritz, 2003) (see Table 1). However, the greatest disadvantage of the entrustment arrangement was that herders and guardians could not always be trusted. There was always the risk that herders would sell cattle without permission and tell the owner that the cattle were lost or stolen. To minimize this risk, peri-urban pastoralists frequently visited their herds in the bush, sometimes travelling for a day or more, to keep a close eye on the herder and check the health of their cattle. Exhausted or emaciated animals from the bush herd were often transferred to the village where they were fed supplementary feed, while cattle bought on the market were put discreetly in the bush herd. Resources were thus exchanged frequently between bush and village herds.

(d) *Economic performance*

The use of cottonseed cakes has considerable advantages aside from securing cattle's survival through the dry season crunch. Cottonseed cake is an excellent feed for cattle because it has a high content of protein (25–40%), fat (10–23%), and cellulose (25–30%). The nutritional value of cottonseed cakes and its effect on milk production and reproduction have been demonstrated in several experimental studies in Cameroon (Njoya *et al.*, 1997). FulBe pastoralists attest to these benefits of cottonseed cakes. [10] Overall, the herd data (collected in a drought year) suggest that intensification leads to greater herd growth through higher fecundity rates and is thus an adaptive strategy in reproductive terms, particularly in drought years when natural forage is a problem throughout the Far North (see Table 1).

But the intensification has led to a significant increase in production costs. In the past, the use of production inputs was minimal and many of them were free (e.g., salt, sorghum stalks, and vaccinations). Today, the use of inputs has increased significantly and none of them are free. The biggest cost increase is due to the use of cottonseed cakes and hulls; they represent more than 60% of the total costs. Consequently, the overall average annual production costs per animal are significantly higher in the peri-urban village than in the agro-pastoral and nomadic villages, respectively, 12,371 FCFA ($16.50), 1,581 FCFA ($2.10), and 2,344 FCFA ($3.15) per animal (see Table 1). [11] The commoditization of pastoral production inputs is common in other more densely populated areas in West

Table 1. *Modeling annual financial returns and herd growth in four villages*

	Peri-urban village		Agro-pastoral herds	Nomadic herds
	Village herd	Bush herd		
Fecundity rate	0.52	0.44	0.38	0.40
Herd size	100	100	100	100
Number of calves	52	44	38	40
Average cattle sales price	104,278	78,500	84,737	71,384
Estimated value calves	31,283	23,550	25,421	21,415
Total value of calves	1,638,161	1,031,144	953,560	865,522
Costs per animal	12,371	2,984	1,581	2,344
Total costs herd	1,237,143	298,374	158,051	234,436
Net return	401,018	732,770	795,508	631,086
Net return per animal	4,010	7,328	7,955	6,311
Net financial return	1.3	3.5	6.0	12.3
Projected offtake to cover costs	11.9	3.8	1.9	3.3
Net herd growth	40.1	40.2	36.1	37.7

This model uses a hypothetical herd size of only females to assess the *net financial returns* and *net herd growth* in each pastoral system (data from Moritz, 2003). The *estimated value of the calves* is 30% of the average cattle sales price in each village. All prices are in FCFA. The percentage is based on price comparisons of different types of livestock sold at the Maroua market in 1999 and 2000 (data from the Ministry of livestock, fisheries, and animal industries (MINEPIA)). *Net return per animal* is based on the number of animals in the starting herd (100). The *projected offtake* uses the average cattle price in each village to estimate the number of cattle that needs to be sold to cover production costs. *Net financial return* is net return per FCFA invested, that is, total value of calves divided by total costs of the herd.

Africa (Bayer & Waters-Bayer, 1995, p. 67; Requier-Desjardins, 2001, pp. 51–64), but the costs in the peri-urban area of Maroua are comparatively much higher.

A comparative analysis of three pastoral systems (peri-urban, agro-pastoral, and nomadic) shows that intensification is a financially sustainable adaptation to the disappearance of rangelands for peri-urban pastoralists (Moritz, 2003). The higher fecundity rates resulting from using cottonseed cakes and the higher prices at the local livestock market of Maroua outweigh the considerable financial production costs. However, the peri-urban pastoral system is not the most profitable strategy; the agro-pastoral and nomadic systems are much more efficient in financial terms (see Table 1).

To cope with the disappearance of rangelands, peri-urban pastoralists have not only intensified their production systems but also continued to pursue extensive strategies. Part of the herd is permanently entrusted to nomadic pastoralists or contract herders who are on transhumance in the Logone floodplain and the shores of Lake Maga in the dry season. The advantages of entrusting the bush herd to nomadic pastoralists is that cattle are taken to excellent grazing areas and a relatively low cost. The main disadvantage is the high risk of livestock losses due to theft and/or herder negligence. Peri-urban pastoralists do not entrust their entire herd to nomadic pastoralists because they do not want to put all their eggs in one basket. They also want cattle in the village for milk and ready cash.

Animals are continually exchanged between the bush and the village herds depending on milk and cash needs of the household, labor availability, and the health and condition of the animals in the bush herd. The autonomous development of the peri-urban pastoralists thus involves a combination of intensive and extensive strategies that are fully integrated. Cottonseed cakes are not an alternative to transhumance; they complement each other. In fact, the intensification of the peri-urban pastoral system in the dry season is only possible because the same animals go on transhumance in the rainy season. The increased milk production and higher reproductive rates would not compensate the higher production costs if cattle were to be fed cottonseed cakes throughout the year instead of only during the dry season. More importantly, in terms of labor demands, it becomes almost unfeasible to feed cottonseed cakes to a hundred cattle (which is the average size of the combined bush and village herd) in the current individual feed-

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ing system, let alone find enough cottonseed on the market to feed them all.

4. DISCUSSION

The 1980 Future of Pastoral Peoples conference celebrated the resilience of pastoralists, exemplified by their ability to survive under extremely difficult social, political, and environmental circumstances; but it also raised doubts concerning their future (Galaty, Aronson, Salzman, & Chouinard, 1981). I would argue that the intensification of the peri-urban pastoral system in the Far North of Cameroon is another example of the resilience of African pastoral systems. The intensification is a response to the disappearance of rangelands and subsequent lack of natural forage in the dry season. The way cottonseed cakes are integrated in the peri-urban pastoral system is novel and came forth out of pastoralists' own experimentations (Moritz, 2003, p. 198). Moreover, the pastoral system continues to develop as peri-urban pastoralists are looking for cheaper and more reliable ways to get their animals through the dry season and adapt to the growing pressures on rangelands.

For peri-urban pastoralists, the dichotomy between the pastoral development paradigms of modernization and mobility does not exist. Their immediate concern is the survival of their animals. They achieve this by integrating the two strategies in one pastoral system; they entrust part of their herd to nomadic pastoralists, while intensifying the production system in the village. Even in the management of the village herd, peri-urban pastoralists combine intensive and extensive strategies, by feeding cattle cottonseed cakes in the dry season and sending them on transhumance in the rainy season. Moreover, cattle are frequently transferred between the village and the bush herds, and revenues from one herd are used to cover production costs in the other. In short, intensive and extensive strategies are fully integrated in one pastoral system.

Since peri-urban pastoralists pursue and rely on modernization and mobility strategies, development policies coming forth out of both development paradigms are relevant to support their autonomous pastoral development. Pastoral rights and access to key resources need to be protected in order to support pastoralists' mobility and flexibility in the Logone floodplain and the Diamaré plains. Simultaneously, it is imperative to further the development and marketing of new and cheaper supplementary feeds and veterinary medicines to support the village herds in the dry season. Pastoral development programs should be as flexible in their approach to development as peri-urban pastoralists are and plan beyond the dominant paradigms (Scoones, 1995).

Finally, it is important to consider the political economy in which peri-urban pastoralists have adapted to the disappearance of rangelands, both with regard to extensive and intensive strategies. The monopoly of SODECOTON on cotton production, processing, and marketing, as well as the associated informal market of cottonseed cakes, forms a potential threat to the sustainability of the peri-urban pastoral system. The dependency of peri-urban pastoralists on an expensive and unreliable supply of cottonseed cakes adds another layer of risk to their pastoral system. Development policies that are derived from the modernization paradigm are likely to fail if they do not seriously consider the political context in which intensification takes places, that is, the neo-patrimonial state in which corruption cripples development.

This critique also applies to the mobility paradigm. African governments have a poor record when it comes to protecting pastoral rights to resources and few are willing to protect pastoral areas and pastoralists' rights. Moreover, even if governments commit themselves to protecting pastoral rights, it remains the question how long this commitment lasts. The mobility paradigm makes pastoral development dependent on neo-patrimonial states that are characterized by endemic corruption that turn any pastoral policy into an immediate failure. The political situation of Cameroon, for example, with rampant corruption of traditional and governmental authorities at every level in the administration, makes policies based on the mobility paradigms susceptible to failure (Moritz, 2005).

I argue that we should evaluate the strategies and innovations that pastoralists themselves have implemented, independently of development organizations and research institutions. Peri-urban pastoralists in the Far North of Cameroon combined intensive and extensive strategies to cope with the disappearance of rangelands and they are relatively successful. It is important to evaluate these autonomous developments and strategies in socioeconomic and ecological terms as pastoralists themselves

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invent the future of pastoralism. Proponents of both paradigms could learn from peri-urban pastoralists that their respective solutions are not competing but complementary.

NOTES

1. In the Far North Province of Cameroon, for example, the pastoral sector represents the largest agricultural sector in terms of revenues, surpassing cotton (Moritz, 2003). And the livestock trade, which is part of an international trade network that links pastoral producers in Chad and Cameroon with urban consumers in Nigeria, shows signs of continued growth (Moritz, 2003).

2. Clare Oxby came to similar conclusions and recommendations for pastoral development after reviewing the literature on pastoral nomads and development in 1975 (Oxby, 1975).

3. There are others who argue that extensive pastoral systems have limited potential for increasing productivity to meet the growing demand for livestock products and have great potential for environmental degradation, and that therefore development policies should focus on integration of livestock in intensive agricultural production in peri-urban areas (Delgado *et al*., 1999, pp. 45, 62).

4. In 1980, population densities ranged from 100 to 149 inhabitants per km^2 in the peri-urban area (Seignobos & Iyébi-Mandjek, 2000). Population densities are even higher today.

5. Peri-urban pastoralists also kept goats and sheep. The number of small stock per household ranged from 4 to 50, with an average of 29. But the production of small stock had not been intensified; no cottonseed cakes and hulls were bought for them. I have therefore not included them in my analysis here.

6. Twenty to 25 years ago, the peri-urban pastoral system was in many ways similar to other agro-pastoral systems in the Far North. Until the end of the 1970s, peri-urban pastoralists used to split their herds in the dry season, sending their best animals (*hooreeji*) with household members on transhumance to the Logone floodplain together with herds from neighboring villages, while keeping a few milk cows (*cureeji*) in the village. In the early eighties, the herds were split permanently in which one part was entrusted to nomadic pastoralists (*laddeeji*) and the other part was kept in the village (*wurooji*).

7. I have used the conversion of \$1 = 750 FCFA (*Franc de la communauté financière d'Afrique*). During my research in 2000–01, the exchange rate fluctuated between 700 and 775 FCFA to one dollar.

8. SODECOTON earned about 300,000 FCFA (\$400) from cottonseed cake sales in 1983/1984, which increased to about 1,800,000,000 FCFA (\$2,400,000) in the 1999/2000 administrative year.

9. The reason for individually feeding of cottonseed cakes is that owners are responsible for buying cottonseed for their own cattle. I argue that the growing costs of intensification are partly responsible for this individualization of livestock ownership (Moritz, 2003).

10. FulBe pastoralists confirmed that feeding milk cows cottonseed cakes increases the quantity of milk, though they argue that it decreases the *quality* of the milk. The flavor of "cottonseed milk" is considered inferior compared to that of "grass milk."

11. The costs in the peri-urban area are not only higher because of cottonseed cakes and hulls, although these are the most substantial; the costs of sorghum and hay, herding salaries, watering animals, salt and natron, taxes, and compensation for damages to farmer's fields are also all significantly higher than in the two other villages (Moritz, 2003, p. 208).

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