ellies, F.P.J. and J.A.M. Wanders (1996) *Who Pays the Price? The Production and Marketing of Coffee and Cocoa in Sierra Leone under Structural Adjustment*, Nijmegen Studies in Development and Cultural Change, Vol. 23, Breitenbach, Saarbrücken and Fort Lauderdale.
hanin, T. (1971) Cooperation and collectivization: the case of Eastern Europe, in P. Worsley (ed.) *Two Blades of Grass: Rural Cooperatives in Agricultural Modernization*, Manchester University Press, Manchester, pp. 253-74.
hanin, T. (1982) Defining peasants: conceptualizations and deconceptualizations, *Sociological Review*, Vol. 30, no. 3, pp. 407-33.
hanin, T. (1987) Peasantry in political action, in T. Shanin (ed.) *Peasants and Peasant Societies Selected Readings* (2nd. edition), Blackwell, Oxford, pp. 357-64.
Wolf, E.R. (1966) *Peasants*, Prentice Hall, Englewood Cliffs, N.J.
Worsley, P. (ed.) (1971) *Two Blades of Grass: Rural Cooperatives in Agricultural Modernization*, Manchester University Press, Manchester.

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9
Stockbreeding in Western Africa

Leo de Haan

Introduction*

As with so many other subjects, Jan Kleinpenning did not neglect to pay attention in his *Profiel van de Derde Wereld* (Kleinpenning 1978:83-89), to the role of cattle breeding in agriculture in developing countries. In his view, cattle breeding was often a marginal activity and the livestock were poorly fed.

With reference to Africa, he pointed to population groups in the steppes and desert zones, who, unlike peasants keeping livestock as a supplement to crop cultivation, entirely depended on livestock raising. As he had already done in his *Geografie van de Landbouw* (Kleinpenning 1968:240), he called them people with a pastoral economy who constantly shift their herds to new pastures in order to adapt to unfavourable natural conditions. He gave the example (Kleinpenning 1978:85) of the Fulani of North Nigeria, who are called Peul in French, but whom I prefer to call Fulbe, the name they use themselves.

Kleinpenning explained that the Nigerian Fulbe graze their herds in the northern parts of the country during the rainy season from June to September and migrate in the dry season with their herds to areas situated further south, where pastures and water are still available. This *transhumance*, as the trek is called, permits the Fulbe to keep much larger herds than would have been possible if they had stayed in the North during the dry season. He argues that, despite this adaptation to the physical environment, fodder for the cattle is meagre, because these natural grazing areas cannot provide large quantities of high quality feed. In general, he notes, little has been done in Africa to improve selective breeding and fodder. Finally, he demonstrates that large parts of tropical Africa suffer from tsetse fly-induced *trypanosomiasis* (sleeping sickness), which makes cattle raising virtually impossible (Kleinpenning 1978:87).

In his view, Third World livestock production had a large potential for expansion and to improve its integration with crop production through the use of manure and draught animals. Following Dumont's *révolution fourragère*, Kleinpenning (1978:88)

* The examples of the Wodaabe and Macina Fulbe are taken from a research proposal for the European Union that I wrote with Gerrie Breukers in 1992. In 1994 I wrote a concise French version of the review of livestock development policies for a report that resulted from that same European Union-funded, research project. The latter, which was called Pastoral Associations and Natural Resource Management in West Africa, was carried out together with Pyt Douma and Mbarack Diop, Hamidou Sidikou in Niger, Honoré Somé in Burkina Faso and Bakary Coulibaly in Mali. Lastly, I would like to thank Camilla Tolhurst for her correction of my English.

considered the improvement of pastures and the production of fodder as key elements in increasing livestock productivity.

In this chapter, I shall demonstrate that, initially, much effort was indeed put into programmes in Africa to improve cattle breeds and to ameliorate the fodder situation in order to boost meat production. During the last decade, however, the emphasis on expanding production has been relaxed in favour of comprehensive resource management by pastoral groups. This shift has coincided with new insights into dry-range ecosystems and their vegetation biodynamics and increased scientific recognition of the efficiency of, what Kleinpenning called, pastoral economies. Following a recent controversy provoked by Blaikie (1995; 1996a and 1996b), this new knowledge should be understood as part of a paradigm shift from classic and neo-liberal thinking to post-modernist neo-populism.

I shall start below with a brief and general view of pastoralism in Africa, focusing mainly on the Fulbe in West Africa. After that I will discuss subsequent livestock development policies and demonstrate to what extent new perspectives are linked with new scientific thinking.

African pastoralism

The pastoral economy described by Kleinpenning is estimated to comprise about 40 percent of the total livestock population in Sub-Saharan Africa (Breukers 1991:15). It was and still is, in many cases, characterised by the subsistence production of cattle for the purpose of milk supply, an adaptation to environmental variability by geographical mobility to different, sometimes specific, natural grazing areas, which are often held in common property. Food requirements are also met by the production, barter or purchase of grain.

In Africa, this type of exploitation of natural resources is mostly associated with drylands, although pastoral economies are not limited exclusively to these areas and, in fact, in West Africa show a recent tendency to expand into wetter, even sub-humid, areas. Until recently, these wetter areas were inaccessible for cattle herds because, generally, they were infested by the tsetse fly. However, successful tsetse control programmes, improved veterinary services and crossbreeding with trypo-resistant breeds, together with decreasing annual rainfall, have enlarged the range of pastoralists. In Benin, for example, Fulbe herders can now be encountered as far south as the ninth parallel.

The typology in Table 1 is well suited to our purpose of showing the different types of African pastoralists and their main characteristics.

Table 1 Types of pastoralists

	Nomadic	Transhumant	Agro-pastoralist
Degree of aridity	very high	high	medium-low
Annual rainfall (mm)	0-200	200-400	400-1000
Species	camel, goat	mixed	cattle, sheep
Mobility range	long	medium-long	short

Source: adapted from Breukers (1991:13)

Geographical mobility becomes more important as aridity increases. Nomadic pastoralists lack a permanent homestead, but do follow more or less regular trekking patterns with their herds. Camels stand prominent as species.

In contrast to these nomads, transhumants do have a permanent homestead, where they usually cultivate crops. However, unpredictable rainfall often causes crop failures. Cattle appear beside camels, goats and sheep in the herds of these pastoralists.

Agro-pastoralists have important and regular crop harvests. Sometimes their crop production is even more important than the proceeds from their livestock. Nevertheless, they still consider themselves as pastoralists, i.e. cattle herders.

For all types of pastoralists, mobility is induced by the drying up of wells and water pools and pastures running short of fodder. As a consequence, they migrate to new drinking places and greener pastures. Nevertheless, for agro-pastoralists, usually living in wetter areas, the need to bring the herds to more remote areas during the growing season, where they cannot cause damage to the crops of surrounding peasants, is an equally important motive for transhumance.

Among the African pastoralists, the Fulbe (called Peul in French or Fulani in English) are by far the most numerous. Their social structures vary considerably. On the one hand, there are the Wodaabe of Niger, who lack any kind of central political organisation or institutions to enforce property regulations over rangelands and do not have any social hierarchy beyond the simple lineage systems of social organisation. On the other hand, not more than a hundred kilometres to the south, there are the highly centralised and hierarchically structured emirates of North Nigeria, ruled by Fulbe elites. It is interesting to note that, already in historical times, many Fulbe societies had important urban elements, consisting of both urbanised elites and lower Fulbe without cattle, both interwoven with the pastoral economy of the transhumant or semi-nomadic pastoral groups.

Although the Fulbe language has many dialects, a Fulbe can travel very large distances through the Sahel and still make himself understood. The Fulbe seem to have spread since the eleventh century from what is now Mauretania and Senegal all over the Sahel to Chad and even Sudan (Blench 1996; Abu-Manga 1996). Since the medieval period, their advance has been associated with the spread of Islam, as is the foundation of larger political Fulbe structures in Mali, Niger, Nigeria and Cameroon (Blench 1996:8). Fage (1995:197-208) demonstrates that Fulbe clerics were among the leaders of Islamic scholarship in the Sudan and Sahel zones. From the seventh century, Fulbe herdsmen were pressing into agricultural lands under the cover of jihad. As a result, several Islamic states emerged under Fulbe elites, such as those in Hausaland in the early nineteenth century.

Fulani herdsmen also settled along the Niger and Bani rivers in what is now Mali. At the beginning of the nineteenth century the Macina Fulbe, named after their capital, gained control over the inner delta of the Niger, an ecologically highly complex region, with numerous river beds, flood plains, ponds and adjacent dunes. The huge natural resources of fish, arable land and pastures of *borgu* grass, attracted various ethnicities, all with their particular livelihood systems such as fishery, agriculture and cattle raising, to the region. The *dina* system of property rights and land use was imposed upon Fulbe, nobles and non-nobles alike, and other ethnicities by the Fulbe ruler, Sheku Ahmadu. The dina, regulating the rights to the forage, agricultural and fishery resources of the inner delta, consisted of four elements. It specified the allocation of grazing rights among

groups of Fulbe herders; the dates at which these groups of herders could enter and had to withdraw from the delta; the transhumance routes to and from the delta; and the relationships between the groups. The delta was and, to a certain extent still is, divided into territories of different Fulbe groups, each containing a village of sedentary pastoralists, several agricultural villages inhabited by dependents of the Fulani, and a pasture area which includes water points and high and low pastures on which cattle can live for seven or eight months. The pasture of each clan area was collectively owned, although ownership has tended to become concentrated into the hands of a few families, because some families left in the course of time, while newcomers were not granted ownership rights. Moreover, decision making power became increasingly concentrated into the hands of the traditional pasture chief (Niamir 1990; Lawry 1989; Bennett et al. 1986; see also Gallais 1967).

The Wodaabe of the Zinder province in what is now Niger are often regarded as the opposite example of social organisation among the Fulbe. These nomadic Fulbe are considered to be superior livestock managers and are known for their intricate pasture, herd and water management strategies, ensuring sustainable resource exploitation. Before the colonial period, the Wodaabe used to live in the northern regions of what is now Nigeria and the southern regions of present-day Niger, whereas the nomadic Tamacheq (Tuaregs as they were called by the French) occupied the central and northern regions of Niger. After the French curbed the military threat of the Tamacheq, the Wodaabe started to herd in this central region, but they were also pushed by the population growth-induced invasion of their southern pastures by crop cultivators. This migratory drift was facilitated by the fact that the Wodaabe, as opposed to the Macina Fulbe discussed above, are not organised territorially. Their social organisation is flexible, the main unit being a migratory group composed of several clans under an elected leader, the *ardo*, enabling them to create new niches in existing range lands. Spearhead migratory groups move into a new grazing area, using it at first only as wet season pasture. After a few years, they dig wells and start to use the area as a dry season base. When they move further north in the wet season, other Wodaabe groups, less mobile or more recently arrived, start to occupy the first area during the wet season. The Wodaabe use public wells or have a specialist to dig deep wells for them; the well is then the collective property of the subscribers. Others dig fresh shallow wells each year. In these cases, use of the water is strictly reserved to members of the group.

Although the Wodaabe are primarily cattle raisers, they have diversified their herds since the drought of the 1970s and have even taken up camel raising like the Tamacheq. However, Wodaabe livestock management is different from that of the Tamacheq in the same area; the Wodaabe supervise their animals more closely and generally take them much farther from the water point than the Tamacheq. As a result, there is often not too much competition for pasture between the two ethnicities (Malike et al. 1984).

Throughout West Africa, the pastoral economy of the Fulbe has changed since the droughts of the 1970s and 1980s. Many have lost their herds and have not been able to reconstitute them, since traditional relief systems have collapsed. Alhough they still consider themselves as pastoralists, they now entirely depend on crop cultivation, in which they generally do not excel. Others have become salaried herdsmen for big cattle owners. These owners are no longer necessarily Fulbe; many urban traders and civil servants have profited from the low cattle prices and have invested in herds. Moreover, many Fulbe herders have migrated to southern areas and now enter into increased

resource competition with crop cultivators. Lastly, market integration has increased; Fulbe now depend on markets for many inputs and for food, while they are at the same time confronted with increased competition from livestock fattened by peasants.

Livestock development policies

In an extensive analysis of livestock development policies in Africa, Breukers (1991) distinguishes three successive periods. The colonial period was characterised by a range of different objectives and measures, which generally came down to the pacification and administrative integration of the pastoralists and the strengthening of production in order to increase the tax base of the colonial governments.

In the period between 1960 and 1980, most countries, having recently gained their independence, had a firm belief in the prospects of modern livestock management techniques to boost production for the national and international market. Range conservation, aiming at improved productivity of pastures as one of the major production factors, stood prominent. On the technical side, policy instruments to implement these goals were: the provision of water points and veterinary services, including livestock vaccination programmes, the introduction of improved and disease-resistant breeds, tsetse control and the fight against grassland or bush fires. Important measures on the organisational side included land tenure regulations through grazing and ranching schemes, and market regulation through the strengthening of marketing boards, the construction of abattoirs, meat-processing and trekking route facilities.

After 1980, it became increasingly clear that the western-inspired changes in land tenure, herd management and resource conservation did not match the livelihood strategies of the pastoralists for whom livestock breeding was rather a way of life than a commercial enterprise. More attention was therefore paid during this period to the production strategies of the pastoralists and the economically-oriented livestock development approach was supplemented by a welfare approach. Donor agencies nevertheless became increasingly reluctant to finance new livestock projects. In general, a period of reflection had arrived, marked by a growing appreciation of the efficiency of traditional pastoral systems and their institutions for resource management. In particular, problems of land degradation, or supposed land degradation, in drylands were no longer imputed solely to overgrazing, but to a complex whole of grazing, population growth, encroaching crop cultivation and wood fuel exploitation. The policy objective of increased meat production was now generally directed to the sub-humid zones, while in the drylands, attention shifted towards resource management in the broadest sense, giving priority not only to local participation, but also to cost recovery.

Dutch researchers made a large contribution to this increased appreciation of the efficiency of traditional pastoralism (Penning de Vries and Djitèye 1982; Breman and de Ridder 1991). They have shown that, despite the low productivity per head of cattle, the production per hectare in the Sahel equals or surpasses that of modern livestock ranches in the United States and Australia under similar rainfall conditions. Moreover, they also observed that, within Africa, livestock production per hectare is higher in traditional production than on modern ranches.

Behnke, Scoones and Kerven (1993), Scoones (1994) and Behnke and Kerven (1994), have recently demonstrated in various states of the art studies how scientific opinion about traditional range management in Africa has dramatically changed in the last

decade. The success or failure of traditional range management practices were judged originally using botanic indices related to the Clementsian model of climax vegetation community succession. This model suggests that, in response to variations in grazing pressure, range condition can be manipulated backwards and forwards from good to poor states along a graded continuum (Prior 1994:17). However, measuring the state of the vegetation by this type of assessment is questioned with regard to Africa. The Clementsian model presupposes that every area has its own climax vegetation, depending on soil and climate. After an area's vegetation is exploited, vegetation will eventually return to its climax vegetation once exploitation stops. Following this model, it was supposed to be the responsibility of the herder to maintain an equilibrium between the grazing pressure of his herd and the natural regeneration pressure of the ecosystem in the direction of the climax vegetation.

However, research has indicated that areas with significant climatological variation, such as the drylands of Africa, do have a climax vegetation, simply because environmental variability is so extreme that average situations are an exception to the rule. This means that herders cannot maintain an equilibrium between grazing pressure and the carrying capacity of natural resources, because the latter is constantly changing. In climatically unstable environments the dominant factor influencing changes in vegetation is rainfall, which lies outside the control of the herders. Less grazing pressure in one year does not guarantee success in the next year, because a dry spell may then rule out any exploitation. Thus the only option open to range managers, who cannot control the environment, is to adapt to it. This is currently called opportunistic range management, which is characterised by the herder's objective of maintaining large and productive herds if rainfall and vegetation permit and destocking as quickly and profitably as possible when circumstances dictate (Beeckman and Clarysse 1991; Behnke, Scoones and Kerven 1993; Scoones 1994; Behnke and Kerven 1994; Prior 1994).

French colonial policy in West Africa was mainly oriented towards the increase of meat production by traditional pastoralists (Douma et al. 1994:19-30). Under this *politique de la viande* much effort was put into the training of veterinary personnel and setting up a network of veterinary posts, where medicines were distributed, livestock was vaccinated and the health of slaughtered animals was certified. French research was concentrated mainly on disease control, the production of vaccines and the breeding of trypo-tolerant cattle. New grazing areas were opened by the construction of wells. Trekking routes to market outlets were equipped with physical infrastructure. Unlike in some East African colonies, pastoralists were not forced to settle, but no attention was paid to environmental effects.

After independence, this policy was continued, especially under the auspices of the European Development Fund (EDF) of the European Union, the second largest donor in this field after the World Bank. Often considered as the successor of the French *politique de la viande*, the EDF did indeed mainly limit its attention to veterinary services and cross-breeding. The extermination of the rinderpest in West Africa around 1977 may largely be attributed to the EDF-financed vaccination campaigns. When the rinderpest broke out again in 1983, resulting in high cattle mortality rates in the Sahel, efforts were re doubled. The EDF did of course also finance the construction of abattoirs. Recently, the fund has not been able to escape from the new approach of cost-recovery and privatisation. Therefore local organisations of pastoralists are being established, to which the management of veterinary services, depots, water points and dairy posts can be entrusted.

Another path in livestock development policies was inspired by the World Bank, the largest donor in this field in West Africa. In the early 1970s, ranching projects were started, following earlier examples of settlement schemes for nomadic and semi-nomadic pastoralists in East and Southern Africa. This policy brought about heavy capital investments in fencing, water development and the introduction of exotic breeds. The approach meant, in fact, the transfer of western ranching technology to semi-arid and arid tropical areas under expatriate management on parastatal ranches (de Haan 1994), as in Burkina Faso and Ivory Coast.

Because western technology proved to be inappropriate in the environmental, cultural and institutional conditions of the Sahel and, moreover, because parastatal status induced high production costs, the ranch approach was a complete failure. As a result, most ranches were transformed into other types of livestock projects discussed below.

The late 1970s witnessed the rise of range-livestock projects which focused on the development of communal rangelands through the construction of a physical infrastructure such as water points, roads and markets. At the same time, in Senegal and Niger, increased attention was paid to the adjudication of official land and grazing rights to pastoral groups. In Burkina Faso, group ranches like those in Kenya were established, some on a former parastatal ranch. Although associations of pastoralists became really involved in resource management in Senegal, Mauretania and Chad, C. de Haan (1994) judged the results to be generally poor, because of the lack of incentives to pastoralists. He reported that poor cattle prices were offered to herders by the parastatal marketing monopolies, land and grazing rights were rigidly imposed, the implementing agencies were institutionally weak and an interdisciplinary approach was lacking.

At the end of the 1980s, more attention was paid to local participation by so-called pastoral associations. These associations, mostly modern institutions, but often with a background rooted in the traditional social structure, began to play an important role in the organisation of herder-managed services such as animal health and the provision of water. It became widely accepted, for example, that before a water point was developed, exclusive user rights were transferred to the pastoral association and responsibility for management and maintenance was vested in its hands (de Haan 1994). On the other hand, in order to ensure maximum mobility for pastoralists and their herds, the rigidity in land and grazing rights allocation was relaxed. Projects representing this approach were executed in many countries in the Sahel, such as Senegal, Mauretania, Mali, Niger and Chad.

The current strategy of integrated natural resource management originates from this pastoral associations approach. It aims at even more comprehensive natural resource management by pastoral associations, in which not only pastoralists participate, but also other stakeholders like crop cultivators and traders. There is increased attention to the privatisation of livestock services. Although promising on paper, the execution of this new approach is complex and therefore difficult. Pastoral associations in Chad, Niger, Mali, Mauretania and Senegal are now being charged with project implementation at grassroots level. Activities are focused on the primary needs of herders, such as water, veterinary services, and not necessarily on resource management. The World Bank has finally understood that pastoralists do not organise themselves to destock their herds and to avoid overgrazing. Opportunistic herding is now recognised as a sensible strategy, which consequently reduces the donor's stress on conservation and destocking. It is thought that, if viable associations grow around the real needs of the pastoralists, they

will eventually also turn to resource management, where feasible (Gilles and de Haan 1994; Gilles 1994). This point is illustrated by Swallow (1994) with reference to successful pastoral associations in Senegal. Only after they had become effective suppliers of fodder supplements and veterinary inputs and stood surety for joint loans, did these associations start to perform tasks in the sphere of common property management, such as coordinating grazing and watering cattle. A protocol agreement that permitted the pastoral associations to register communal rights proved to be the factor enabling the move to resource management.

EDF livestock projects are now also showing a tendency towards comprehensiveness. Next to veterinary care and water points, resource management is now prominent, including attention to the juridical framework and property rights. Furthermore, food security, including grain banks, has become an important component.

Conclusion

I have shown that livestock development policies in Africa were at first production-oriented, but subsequently paid more attention to natural resource management and the welfare of the pastoralists. However, commenting on the latest World Bank strategy, Vedeld (1994) has the impression that pastoral associations often represent old ideas in a new mould. In his view, governments and donor agencies still expect these associations to achieve the old objectives of the ranching and range-livestock schemes like destocking, rotational grazing and maintaining an equilibrium between grazing pressure and the carrying capacity of the area. He has calculated that costs for training and organisation in the pastoral association approach cover only 5 to 10 percent of the total budget. He therefore concludes that these elements are not really considered as key factors and that the projects are, in fact, still focused on production, as during the earlier periods.

Vedeld's evaluation sheds interesting light upon the connection between new or successive livestock development strategies and new scientific knowledge. On various recent occasions, Blaikie (1995; 1996a and 1996b) has pointed to a paradigm shift in development studies. He discerns a classic school and an opposing neo-liberal school of scientific thinking; in the 1980s a neo-populist school dissociated itself from the classic school. The neo-populist approach represents a continuum of views, with common denominators like local participation, bottom-up, process-orientation, indigenous knowledge and empowerment. Although Blaikie admits that his characterisation of the different paradigms is ideal-typical, an example from veterinary research may serve as a useful illustration (adapted from Blaikie 1996a:7-12). In the classic approach, a problem in livestock raising, such as low meat production per head of cattle, would be identified by external agents. Technical measures would then be developed, say cross-breeds on research stations and, finally, pastoralists would be encouraged, persuaded or forced to integrate a new breeding bull into their herds. Failures would be attributed either to misapplied research, lack of fit with pastoral strategies or bureaucratic inadequacies. The neo-liberal approach would postulate that an appropriate technology already exists and that adoption of the breeding bull only depends on appropriate incentives for the pastoralists. Failure would be attributed to an inappropriate structure of incentives, such as distortions in meat prices, inadequate policies for the provision of public goods, such as roads to the markets, and inappropriate patterns of property

rights, particularly the persistence of open access rangelands. In the neo-populist approach, local knowledge is central. Pastoralists themselves would use their own knowledge and skills to work out their own solutions to the problems they encountered, such as cattle diseases or the availability of water. Participatory technology development would be the key-word for researchers and empowerment a condition for successful implementation.

Blaikie's analysis offers an excellent framework for positioning both the successive livestock development policies in Africa and the advancement of scientific thinking about African pastoralism. It also enables us to situate the different authors, including Kleinpenning. Early EDF and World Bank interventions, including the range-livestock projects of the 1970s, were clearly classic.

De Haan's (1994) evaluation of these interventions is typically neo-liberal, blaming the lack of incentives for pastoralists. Not surprisingly, the subsequent interventions could be labelled neo-liberal, although since the 1980s, starting with the attention to pastoral associations, the neo-populist commitment, even in World Bank projects, has become increasingly strong. Vedeld (1994), who argues that this commitment is only lip service, is typically a neo-populist purist. Finally, it becomes clear that the present appreciation of the pastoralists' opportunistic herding strategies by authors like Scoones, Behnke and Kerven could only become *en vogue* on the waves of a victorious neo-populist post-modernism.

And how could Jan Kleinpenning's position on the pastoral economy in *Profiel van de Derde Wereld* be characterised? I would maintain that it is clearly classic and characteristic of its time. His analysis of the problem is that of an external expert; his solutions are technical and production-oriented, as he puts emphasis on improved breeds, fodder and tsetse control. Although he also points to particular cultural factors as potential bottlenecks for further development of the livestock sector, these do not apply to the pastoral economies under examination. But does this matter? Although neo-populists would strongly disclaim it, there is nothing against external experts taking a view on what should be done. After all, in their concern for genuine local participation, neo-populist scientists and NGO workers also implement so-called trigger initiatives to awaken their target groups, set local agendas and act as self-appointed spokesmen for the local population, in other words, they intervene as much as their opponents do. Fulbe herders have always had a keen interest in cross-breeds, as changing circumstances made them attractive, and agro-pastoralists now show an interest in improved fodder. The brief review of pastoralism in Africa and the attention to the Wodaabe and Macina Fulbe have not only amplified the picture drawn by Kleinpenning, but have shown at the same time that we are dealing with dynamic pastoral systems which are now under pressure, but still represent a wealth of livelihood strategies for development geographers to examine. The results may contribute to more appropriate livestock development policies, despite all the ambiguity one may feel if one has to account for the narratives of which one is a part.

References

Abu-Manga, A. (1996) Socio-cultural, socio-economic and socio-linguistic diversity among the Fulbe of the Sudan Republic (paper presented at the Conference "Pastoralism under Pressure: Ecological and Political Changes among the Fulbe", African Studies Centre, Leiden).

Beeckman, H. and A. Clarysse (1991) Numerische vegetatie-ecologie en populatie-dynamica, (Syllabus Universiteit Gent, Faculteit van Landbouwwetenschappen, Gent).

Behnke, R., I. Scoones and C. Kerven (1993) *Range Ecology at Disequilibrium. New Models of Natural Variability and Pastoral Adaption in African Savannas*, Overseas Development Institute and International Institute for Environment and Development, London.

Behnke, R. and C. Kerven (1994) Redesigning for risk: tracking and buffering environmental variability in Africa's rangelands, *Natural Resource Perspectives*, no. 1, Overseas Development Institute, London.

Bennett, J., S. Lawry and J. Riddell (1986) Land tenure and livestock development in Sub-Saharan Africa, *USAID Evaluation Special Study*, no. 39, Land Tenure Center, Madison.

Blaikie, P. (1995) Changing environments or changing views. A political ecology for developing countries, *Geography*, Vol. 80, no. 3, pp. 203-14.

Blaikie, P. (1996a) Science, governance and the market in the Blue Corner versus folk knowledge, custom and autarky in the Red Corner... (paper for the Annual Meeting of the Association of American Geographers, Charlotte).

Blaikie, P. (1996b) New knowledge and rural development: a review of views and practicalities (paper for the 28th International Geographical Congress, The Hague).

Blench, R. (1996) Why are there so many pastoral groups in eastern Africa? (paper for the Conference "Pastoralism under Pressure: Ecological and Political Changes among the Fulbe", African Studies Centre, Leiden).

Breman, H. and N. de Ridder (eds.) (1991) *Manuel sur les Pâturages des Pays sahéliens*, Karthala, Paris.

Breukers, G. (1991) The common tragedy of Hardin's tragedy of the commons: livestock development policies in the pastoral areas of Subsaharan Africa (*Management Regimes For Common Pool Natural Resources Discussion Paper*, no. 8, Institute of Social Studies, The Hague).

Douma, P., M. Diop and L. de Haan (1994) *Les Associations pastorales et la Gestion des Ressources naturelles*, Tome no. 1, 2, 3, 4, Université d'Amsterdam and Commission des Communautées Européennes, Amsterdam.

Fage, J. (1995) *A History of Africa* (3rd. edition), Routledge, London.

Gallais, J. (1967) *Le Delta intérieur du Niger: Étude géographique régionale*, IFAN, Dakar.

Gilles, J. (1994) The World Bank and pastoral development, *Pastoral Development Network Paper*, no. 36b, Overseas Development Institute, London, pp. 15-16.

Gilles, J. and C. de Haan (1994) Recent trends in World Bank pastoral development projects: a review of 13 Bank projects in light of the new pastoral ecology, *Pastoral Development Network Paper*, no. 36b, Overseas Development Institute, London, pp. 7-14.

Haan, C. de (1994) An overview of the World Bank's involvement in pastoral development, *Pastoral Development Network Paper*, no. 36b, Overseas Development Institute, London, pp. 1-6.

Kleinpenning, J. (1968) *Geografie van de Landbouw*, Het Spectrum, Utrecht.

Kleinpenning, J. (1978) *Profiel van de Derde Wereld. Een Inleiding tot de Geografie van de Onderontwikkeling*, Van Gorcum, Assen.

Lawry, S. (1989) Tenure policy toward common property natural resources, *Land Tenure Center Research Paper*, no. 134, Madison.

Malike, A., C. White, L. Loutan and J. Swift (1984) The Wodaabe, in J. Swift (ed.) *Pastoral Development in Central Niger: Report of the Niger Range and Livestock Project*, Ministère du Développement Rural and USAID, Niamey, pp. 255-529.

Niamir, M. (1990) Herders' decision-making in natural resources management in arid and semi-arid Africa, *Community Forestry Note*, no. 4, Food and Agricultural Organisation, Rome.

Penning de Vries, F. and M. Djitèye (eds.) (1982) *La Productivité des Pâturages sahéliens: une Étude des Sols, des Végetations et de l'Exploitation de cette Ressource naturelle*, CABO, Wageningen.

Prior, J. (1994) Pastoral development planning, *OXFAM Development Guidelines*, no. 9, OXFAM, Oxford.

Scoones, I. (1994) *Living With Uncertainty. New Directions in Pastoral Development in Africa*, Intermediate Technology Publications, International Institute for Environment and Development, London.

Swallow, B. (1994) The role of mobility within the risk management strategies of pastoralists and agro-pastoralists, *Gatekeeper Series*, no. 47, Overseas Development Institute, London.

Vedeld, T. (1994) Procedural law: land tenure reforms as a long-term political process, *Pastoral Development Network Paper*, no. 36b, Overseas Development Institute, London, pp. 17-22.