PASTORALISM IN ETHIOPIA, KENYA AND SOMALIA: A SELECTED ANNOTATED BIBLIOGRAPHY

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PASTORALISM IN ETHIOPIA, KENYA AND SOMALIA: A SELECTED ANNOTATED BIBLIOGRAPHY

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CONTENTS

GENERAL

(1) Behnke, R. H., & Scoones, I. (1993). Rethinking Range Ecology: Implications for Rangeland Management in Africa. In *Range ecology at disequilibrium: New Models of Natural Variability and Pastoral Adaptation in African Savannas,* (eds.) R. H. Behnke, I. Scoones, & C. Kerven, (pp.1-30). London, NW1 4ANS: Oversease Development Institute.

> This chapter begins by distinguishing between the ecological and economic definitions of carrying capacity. The authors go on to discuss pastoral systems and problems associated with rangeland degradation on the basis of carrying capacity, and equilibrium and non-equilibrium grazing systems. The implications of opportunistic management strategies for the design of livestock policies are presented.

(2) Behnke, R. H. (1994). Natural Resource Management in Pastoral Africa. *Development Policy Review* 12 pp.5-27.

This paper discusses the distinction between the ecology and management requirements of equilibrium and non-equilibrium grazing systems. The paper focuses on Africa's rangelands and addresses questions regarding land and water tenure. Behnke essentially endorses African pastoralist's 'opportunistic' and mobile grazing strategies.

(3) Bonfiglioli, A. M. (1992). *Pastoralists at a crossroads: Survival and development issues in African pastoralism.* UNICEF/UNSO Project for Nomadic Pastoralists in Africa. Nairobi, Kenya: UNICEF/UNSO.

The chapters in this report are organized in two main parts. Part I provides a general analysis of the situation of African pastoralists and has four chapters as follows: Chapter 1 sets the crisis of African pastoralism within the broader context of rural crisis in Africa as a whole; Chapter 2 presents a critical analysis of some of the general assumptions and myths about pastoralists that have influenced development thinking; Chapter 3 analyzes the historically-rooted relationships between pastoralists and the state, and; Chapter 4 examines past experiences in pastoral development, believing that understanding the causes of success and failure will lead to better actions in the future.

Part II of the report defines the main issues and eventual program lines for pastoral development. Chapter 5 emphasizes the potential for pastoral institutions to play a crucial role in collaboration with state bureaucracies and development agencies. Chapter 6 identifies several initiatives aimed at strengthening pastoral economies (livestock, natural resources, and production). Chapter 7 outlines the main measures to be undertaken in order to improve basic services for pastoralists in health, education and animal health. Chapter 8 points to the underlying conditions which are necessary to enable pastoralists to attain these general economic, politico-institutional and social objectives of human development.

(4) de Leeuw, P. N., & Tothill, J. C. (1993). The concept of Rangeland Carrying Capacity in Sub-Saharan Africa - Myth or Reality. In *Range Ecology at Disequilibrium: New Models of Natural Variability and Pastoral Adaptation in African Savannnas,* (eds.) R. H. Behnke, I. Scoones, & C. Kerven, (pp.77-88). London: Overseas Development Institute.

Common approaches used to determine the carrying capacity of a given rangeland are investigated. The problems associated with applying the concept in sub-Saharan Africa (SSA) are highlighted and ways of broadening the concept to improve its applicability in SSA are suggested.

(5) Dyson-Hudson, N., & Dyson-Hudson, R. (1982). The Structure of East African herds and the Future of East African Herders. *Development and Change* 13(2): pp.213-238.

In seven pastoral groups (Karamajong, Turkana, Maasai, Samburu, Rendille, Boran and Somali) it is shown that herd structures are a consequence of extreme seasonality and high risk, there being a high proportion of adults and especially females in the herds. Constraints facing beef and milk production are discussed.

(6) Dyson-Hudson, Rada and Eric Alden Smith (1978). Human territoriality: an ecological reassessment. *American Anthropologist* 80: 21-41.

The authors support the use of a model of economic defendability of territory, where territory is defined as an area occupied more or less exclusively by an individual or group by means of repulsion through overt defense or some form of communication (p. 22). According to the model of economic defendability, territorial behavior is expected when the costs of exclusive use and defense of an area are outweighed by the benefits gained from this pattern of resource utilization (p.23). The costs of territoriality include: (1) the time, energy and / or risk associated with defending an area; (2) the possible diversion of time and energy from other necessary activities; and (3) the possible negative consequences of relying on a spatially limited areas for critical resources. The benefits of territoriality are simply those that result from exclusive access to critical resources; however this benefit is conditioned by factor 3 and is relative to alternative (nonterritorial) modes of resource utilization. ... The cost-benefit ratio of a territorial strategy is highly dependent on the pattern of resource distribution (particularly) predictability and abundance. ... Resources that are predictable in their spatio-temporal distribution have greater economic defendability than unpredictable resources (p.24).

The authors apply this model to explain the territorial nature of property institutions among the Karamajong of Uganda. That is, the predictable nature of sorghum growing makes it worthwhile to defend the territory on which sorghum is grown, while the unpredictable nature of forage available on grazing lands makes it not worthwhile to defend grazing territories. Only in times of extreme scarcity do Karamajong herdsmen defend grazing areas and the defended areas are those that have relatively abundant grazing at that particular time. On the other hand, the Karamajong do defend their overall territory against outsiders.

(7) Ellis, J. E., & Galvin, K. (1994). Climate patterns and land-use practices in the dry zones of Africa: Comparative regional analysis provides insight into the effects of climate variations. *BioScience* 44(5):

The authors provide examples to illustrate regional differences in rainfall seasonality, intensity, and interannual variability; and how these cause land-use practices to diverge across the arid and semiarid lands of sub-Saharan Africa. They note that temporal rainfall patterns appear to influence the choice between crop cultivation and pastoralism and the degree of specialization in crops and/or livestock. Thus, somewhat different land-use

systems prevail in comparable rainfall zones across the continent.

(8) Ellis, J. E. (1995). Climate variability and complex ecosystem dynamics: Implications for pastoral development. In *Living with uncertainty: New directions in pastoral development in Africa,* (ed.) I. Scoones, London, UK: Intermediate Technology Publications Ltd.

Ellis underscores the importance of understanding climate variability and how it promotes uncertainty in African ecosystem. He begins by discussing the concept of non-equilibrium theory and its application to dryland ecosystems and African pastoralism. Examples of empirical studies examining how ecosystems respond to climate variability are provided. In conclusion, Ellis discusses how the concepts of rangeland instability, non-equilibrium and climate variability are useful in determining the areas in the drylands of Africa that are most influenced by these sorts of dynamics.

(9) de Haan, Cees (1994). "An Overview of the World Bank's Involvement in Pastoral Development," ODI Pastoral Development Network Paper 36b.

(10) Kirk, M., Rahmann, G. and Weiser, A. (1994). The importance of Technological Change in Animal Production Systems. Animal Research and Development, Animal Production in Semiarid Regions (39): 163-172. Institute for Scientific Co-operation, Tübingen, F.R. Germany.

(11) Kituyi, Mukhisa and Naomi Kipuri (1991). "Changing Pastoral Land Tenure and Resource Management in Eastern Africa: A Research Agenda." Paper presented at the Workshop on 'Land Tenure and Resource Management among Pastoralists.' Nairobi, Kenya, June.

(12) Niamir-Fuller, M. Pastoral development in Africa. In Proceedings of the first technical consultation of donor and international development agencies. Paris, 13 - 14 December 1993. New York: UNSO/UNDP.

This is a summary of an informal consultation on pastoral development in sub-Saharan Africa between technical experts of donor, bilateral and mulitlateral agencies. Contains presentations by invited experts on four main themes: natural resource management, natural resource tenure, pastoral institutions, and national pastoral policies. These themes make up the major elements of "The New Approach to pastoral development."

(13) Niamir-Fuller, M. Pastoral natural resource management and policy. In *Proceedings of the Subregional workshop held 6 - 10 December 1993 in Arusha, Tanzania.* New York: UNSO/UNDP.

Chapter one summarizes the New Approach's main elements as developed by various experts and reviewed by participants. Chapter two to five summarize the expert presentations in each of the four themes, and conclude with comments from participants.

Chapter six provides a synthesis of the reports of the four thematic working groups and the seven country team reports. The country team reports are printed in full in the annexes. Chapter seven sets out the conclusions and recommendations.

(14) Majok, A. A., & Schwabe, C. W. (1998). *Development Among Africa's Migratory Pastoralists.* Westport, CT: Bergin and Garvey.

(15) Roth, E. A., Fratkin, E., & Galvin, K. A. (1994). Future directions in pastoral society and research. In *African pastoralist systems: an integrated approach,* (eds.) E. Fratkin & K. A. Galvin, (pp.231-236). Boulder, Colorado; USA: Lynne Rienner Publishers Inc.

[Cab Abstracts] In this concluding chapter, the dichotomy is identified between those who suggest that East African pastoralists are doomed to extinction and those who argue that pastoralism's inherently adaptive nature will enable it to survive future stresses. The problems that pastoralists now face are emphasized: land security, lack of rural income, and competition from large commercial producers are noted in reports of increasing impoverishment and disempowerment. The increasing encroachment by larger and more powerful populations, and political units and/or economies, heralds major changes in pastoral societies and means that in the immediate future they can only survive in an altered and novel form. New studies on pastoral populations are needed for two reasons: the rapid advance in field-based methodologies for measuring illness; and, the widespread transition from nomadism to sedentarism among African pastoralists today. Combining sedentarism with commercial food production suggests that these populations are at present undergoing not one but two important social transitions. It is suggested that measurement of concomitant shifts in child health, nutrition, growth, and development will provide the test of whether such changes represent true adaptations or merely accommodations.

(16) Sorenson, J. (1995). *Disaster and development in the Horn of Africa.* Basingstoke; UK: Macmillan Press Ltd.

[Cab Abstracts] The volume of 13 essays examines the historical and political background to the crises that have affected the Horn of Africa and outlines the prospects for development in the region. Examples are used from the following countries: Ethiopia, Eritrea, Sudan, Somalia, and Djibouti. The following titles appear: Poverty, powerlessness and the imperial interstate in the Horn of Africa; Intelligence operation in the Horn; Political change in the Horn; Reflections on the political economy of transition in Eritrea; Roots of famine in Sudan's killing fields; Pastoralist resource use and access in Somalia; Disaster, relief and political change in southern Ethiopia; From famine to food security in the Horn of Africa; Land and peasants in Ethiopia; Eritrean women refugees and voluntary repatriation; Disaster in the Horn of Africa the impact on public health; and New regionalisms in Africa as responses to environmental crises: IGADD

(Intergovernmental Authority on Drought and Development) and development in the Horn in the mid-1990s.

(17) Swallow, Brent M. and Daniel W. Bromley (1995). "Institutions, Governance and Incentives in Common Property Regimes for African Rangelands," *Environmental and Resource Economics* 6: 99-118,

(18) Swallow, B. (1994). The Role of Mobility Within the Risk Management Strategies of Pastoralists and Agro-Pastoralists. International Institute for Environment and Development: Gatekeeper Series No.47.

(19) Swift, Jeremy (1995). "Dynamic Ecological Systems and the Administration of Pastoral Development." In Ian Scoones (ed.), *Living with Uncertainty: New Directions in Pastoral Development in Africa*. London: Intermediate Technology Publications, pp. 153-173.

ETHIOPIA

(1) Astatke A and Mohamed Saleem M A. 1996. Draught animal power for land-use intensification in the Ethiopian highlands. *FAO World Animal Review* 86: 3-11.

> This paper presents a sample of alternative uses of animal traction as possible means of intensifying crop production in the highlands of Ethiopia and discusses the obstacles encountered in the transfer of traction technologies. It demonstrates that animal traction with improved implements increases crop productivity on vertisols and can also be used in pond excavation. The ability to cultivate crops on vertisols could serve as an incentive to curtail the movement towards cultivation of steeper slopes that are prone to land degradation. Similarly, the conservation of runoff water in reservoirs excavated using animals could enhance crop and livestock production and make much needed water easily accessible to farm households. Problems remain in matching animals and implements to different soil types and farm resources and in the provision of government technical assistance to various communities.

(2) Belete A, Dillon J L and Anderson F M. 1993. Efficiency of small-scale farmers in Ethiopia: a case study in the Baso and Warana sub-district. *Agricultural Economics* 8: 199-209.

> The objective of this study is to explore the possibilities of improving production and income on small farms through better allocation of resources. The study area was in the low-potential cereals crop zone of Ethiopian highlands in the Shoa region. The basic primary data were drawn from 50 randomly selected farms in the area, and secondary data were obtained from ILCA. Linear and risk (MOTAD) programming models for crop-livestock farming under different existing animal cultivation practices were developed in order to identify the most crucial constraints confronting the farmers. The results indicate

that a substantial potential exists for increasing net farm cash incomes through efficient allocation of available resources under current level of farm technology. Cash incomes for the optimal plans that disregard risk (the profit maximizing LP solutions) were between 47-59% higher than the cash incomes for the actual plans used by farmers. Further, some of the risk-efficient plans (i.e. MOTAD solutions) were superior to the existing plans in the sense that they had higher returns and lower risk. This suggests that a reallocation of the existing resources in an optimal and risk-efficient way under the indigenous technology would increase the productivity on small-scale farms.

(3) Blowfield, M., & Donaldson, T. (1994). Cattle and cribs: grain storage and production amongst pastoralists in Ethiopia and Nigeria. *Paper Pastoral Development Network* No. 37C, pp.1-21.

[Cab Abstracts] This paper illustrates the importance of grain storage amongst some pastoralist groups by giving examples from the Borana in Ethiopia and the FulBe in Nigeria. These examples exhibit the importance of storage systems to pastoralists in different circumstances but also highlight the view that there are no fixed solutions appropriate for all cases. The role of local storage facilities in providing food security for Borana pastoralists was highlighted during a rangelands development project in Sidamo province, Ethiopia. The Borana were forced to respond to conditions of drought by building community stores, using both underground and above-ground designs. The development of storage technology amongst the Borana is described. The lessons learnt with the Borana were subsequently used in a pilot study with FulBe pastoralists in Faluwa, Bauchi State, northern Nigeria. The types of storage they use are outlined. Both groups show the importance of storage systems to pastoralists under different and contrasting circumstances. Both cases reveal that pastoralists are incorporating storage into their livelihood strategies, sometimes as a consequence of environmental stress but also as a routine element in a flexible array of strategies. In contrast to market intervention and cereal bank initiatives, these systems are found at household and intra-household levels and do not mean that practitioners compromise their positions as pastoralists. It is possible that focusing on storage systems presents a new opportunity to assist with pastoralist food security; one that circumvents the initial sensitivity associated with herd manipulation, while at the same time offering an entry point for understanding the complex social and economic relations which are necessary to monitor and assess impact. Working with field-based organizations is essential for achieving this, although government and non-government organizations in Nigeria tend to regard the FulBe as a problem.

(4) Bruce, J. W., Hoben, A., & Rahmato, D. (1994). After the Derg: An Assessment of Rural Land Tenure Issues in Ethiopia. Land Tenure Center, University of Wisconsin, Madison and Institute of Development Research, Addis Ababa University (1994).

The authors provide a comprehensive review of the post-revolutionary land tenure structure, agrarian reform and rural institutions: including the formation of peasant associations, producer cooperatives and service cooperatives. An assessment of land tenure policies and the current status of rural institutions are also presented. The paper thoroughly discusses policy research and policy making institutions at the national, regional and local level discussing their relevance and implication for each property regime: private ownership, state leasehold and limited ownership and elaborates on appropriate options for Ethiopia. Common property and natural resource management are also discussed in relation to the situation in Ethiopia.

[Taken from the paper] An Arssi peasant reflection: Before the Derg we were servants. The Derg gave us land, but took away our children. When the cooperatives came we did not have rest or the right to market our crops. Today is good. Everyone has his own land and can market his own crop. Our only problem now is that there is not enough land (p. iii).

(5) Catley, A. (1996). Pastoralists, paravets and privatization: experiences in the Sanaag region of Somaliland. *Paper Pastoral Development Network* No. 39d, 13 pp.

(6) Cohen, J. M. (1995). Foreign Involvement in the Formulation of Ethiopian Land Tenure Systems. Northeast African Studies 7 (1985) 3: 1-20

The author reviews the fall of the emperor in 1974, the establishment and aggrandizement of the Derg regime and the eastern blocs' influence in the whole process. The paper further discusses the concomitant changes in land tenure policies and gives a synoptic account of foreign involvement; stating the exact role(s) each country played and the mechanism(s) used.

[Taken from the paper] Foreign involvement in Ethiopia's land tenure policies occurred through a complex set of direct and indirect processes involving a wide range of factors and channels in Ethiopia and abroad. Specifically foreign influence occurred through embassy discussions, aid mission programs, multilateral agency technical assistance, private commercial enterprise investments, university training and research, foundation grants, private voluntary organization and religious institution interventions, international labor union activity and general communication media influence. In illustrating these types of foreign interventions, the case study identifies several major channels for attempting to shape land tenure policy.

(7) Coppock, D. L. (1992). "Ethiopian Pastoral Development." National Geographic Research and Exploration 8(3): 296-301

The paper assesses the impact of two intervention measures: cisterns to capture runoff

water and grass hay to feed calves on women's time allocation and household water use during a dry season in the Borana pastoral system. The author uses household data to quantitatively determine how these interventions alter the time schedules of women in the dry season, and if substantial time was saved, to determine the alternative use to which it is allocated. The paper shows that lack of time is a key constraint to increasing the productive output of women in Borana. It concludes that interventions have important technical implications for improving calf management; and that their impact on women's time allocation is small and statistically insignificant. Water use did not also increase (as hypothesized) with increasing water availability, as observed else where in Africa.

[Taken from the paper] There is much of interest here. It provides useful, perhaps important, information relevant to women's world and the integration of women into development programs. The finding that the intervention had little effect of time budgets, in contrast to the results of other studies in Africa is important because it demonstrates that it is risky to over generalize the conclusions of such studies. Similar interventions may have rather different consequences in different situations.

(8) Coppock, D. L. (1993a). Constraints to Development of Extensive Livestock Systems: Experiences from Southern Ethiopia. Animal Production in Developing Countries; British Society of Animal Production 16: 87-100

The paper reviews some aspects of development and change on the Borana rangelands of southern Ethiopia. In particular, aspects of population dynamics (both people and livestock) and other observed changes in social and economic attitudes of the Borana pastoralists are explained and options for research and development interventions recommended.

[Abstract from paper] This paper reviews pastoral research and development perspectives generated from the southern Ethiopian rangelands during the 1980s. This system was selected as a case study of constraints in African pastoral development because the experiences from both research and development are fairly well documented and integrated. Until recently the Borana managed a production system that was fairly typical of semi-settled, traditional pastoralism in East Africa. However, the Borana today are in a state of considerable change that has been induced primarily by a long-term decline in the per capita supply of cow's milk, the traditional dietary staple. This imbalance has resulted from steady growth in the human population in combination with density dependent fluctuations in cattle population. Other major changes in pastoral, social and economic attitudes have occurred as a result of population pressure and exposure to the inhabitants of small towns that have emerged as a result of development of rural infrastructure since the 1970s. Overall, this pressure has led to increased instability and vulnerability of the pastoral population, but also offers new windows for opportunity for application of technical, but especially policy-oriented, interventions.

(9) Coppock, D. L. (1993b). Vegetation and Pastoral Dynamics in the Southern Ethiopian Rangelands: Implications for Theory and Management. In *Range Ecology at Disequilibrium: New Models of Natural Variability and Pastoral Adaptation in African Savannas*, (eds.) R. H. Behnke, I. Scoones, & C. Kerven, (pp.42-61). London: Overseas Development Institute.

> The primary objective of this paper is to review research on aspects of vegetation change and pastoral population dynamics in the southern Ethiopian rangelands during the 1980s and relate these findings to the debate on equilibrial versus non-equilibrial patterns of ecosystem dynamics. Coppock concludes that the fundamental pattern in the Borana plateau is equilibrial rather than non-equilibrial.

(10) Coppock, D. L. (1994). The Borana Plateau of Southern Ethiopia: Synthesis of pastoral research, development and change 1980 - 91. ILCA Systems Study 5. Addis Ababa: International Livestock Centre for Africa.

> This is a comprehensive study that describes the evolving production system of the Borana pastoralists, prescribes development interventions and policies that may promote growth in the livestock sector, alleviate poverty among pastoral producers and encourage ecologically sustainable patterns of resource use.

(11) Coppock, D. L. (1996). Dynamics of a semi-arid pastoral system under induced change in southern Ethiopia. In Rangelands in a sustainable biosphere. Proceedings of the Fifth International Rangeland Congress, Salt Lake City, Utah, USA, 23-28 July, 1995. Volume 2: Invited presentations. Denver; USA: Society for Range Management.

> [Cab Abstracts] Observations from a decade of research into semiarid S. Ethiopia have indicated that increase in human population and settlement and a corresponding decrease in available spare grazing lands have resulted in a reduction in the number of cattle during droughts and environmental degradation. Lack of sound range management theory was not considered a factor in S. Ethiopia.

(12) Cossin, N. J. (1985). The productivity and potential of pastoral systems. ILCA-Bulletin, 21: 10-15

> [Abstract] African pastoral systems are often considered to be relatively unproductive, with poor breeds of animals, present in such large numbers that serious rangeland degradation is unavoidable. An analysis of the Borana pastoral systems southern Ethiopia has shown that this view is wrong. The Borana system is very productive; compared with Australia commercial ranches, the Borana produce nearly four times as much protein and six times as much food energy from each hectare. Introducing food crops and legume forages in this system would effect some improvements doubling the current annual

income. However, continuing population increases could negate this advance.

(13) Cossin, N. J. & Upton, M. (1987). "The Borana pastoral system of southern Ethiopia." Agricultural Systems, 25 (3): 199-218

The author describes the Borana pastoral system and presents the role played by the supply of dry-season well water in facilitating semi-settled existence. He briefly describes the grazing system distinguishing between grazing areas around settlements for lactating cows (warra) and dry-season grating areas far away from the settlement for dry herds (forra). Stocking densities, reproductive rates, milk yield and mortality rates of Borana cattle are presented. The author concludes, " although milk is the staple food of the Borana, grain purchased with proceeds of livestock sales meets over 30% of dietary energy requirement. Overall, the Borana are efficient rangeland and livestock managers, who manage to survive in a tightly constrained environment. These findings suggest that the scope for improvement is limited".

(14) Cossin, N. J. & Upton, M. (1988a). "The impact of climatic variation on the Borana pastoral system." Agricultural Systems, 27 (2): 117-135

[Taken from paper] Rainfall and the length of the growing seasons are highly variable in the semi-arid East African rangelands such a Borana, Ethiopia. Dry years occur in about one year in 5 and droughts one year in 20. Survival is possible in dry years by spending the entire household cash income on food. In drought years, livestock losses and rangeland degradation are mitigated by extensive migration of animals. There is greater dependence on smallstock and camels, and in some instance food crop production. Nonetheless, there is widespread suffering due particularly to loss of calves and milk supplies and deteriorating terms-of-trade for cattle exchanged for cereals. Complete recovery of livestock numbers and human living standards may take many years. Supplementary feeding of calves, or of cows, and production of cereal crops immediately the rains resume may mitigate the effects of droughts.

(15) Cossin, N. J. & Upton, M. (1988b). "Options for improvement of the Borana pastoral systems." Agricultural Systems, 27: 251-278

The paper attempts a diagnosis of constraints to extensive livestock production in the Borana pastoral system and identifies options for improvement. The paper identifies three main options for increasing livestock productivity in the area: i) improvements in marketing systems; ii) increased stocking rates and; iii) greater productivity per livestock unit. The paper continues by discussing in detail the prospects of each option.

[Abstract from paper] This paper discusses options for improvement of the Borana pastoralist system. Overall, the prospects of increasing offtake of livestock or milk, by

improvement in marketing facilities alone are not promising. National policies to avoid serious adverse shifts in the exchange rate of cattle for cereals would reduce suffering in drought years, however. Assessment of primary dry matter production suggests that more livestock could be carried in the north and west of the study area if dry season water supplies could be improved. Against this, evidence of rangeland degradation in these zones suggests dangers in increased stocking. The Borana practice of 3-day watering of cattle during the dry season is beneficial in reducing water and primary dry-matter requirements during these periods of shortage. Desilting of existing surface ponds and construction of new ones could be beneficial if sited in areas of underutilized rangeland. Borana cattle are generally more productive than other forms of livestock, with quite high rates of reproduction and milk yield and low mortalities. The practices of relying on milk for subsistence and disposing of young animals to maintain a high proportion of cows in the herd appear rational. The only apparent aspect of productive performance with scope for improvement is in cattle growth rates. The production of small areas of leguminous fodder is recommended for the supplementary feeding of calves.

(16) Dessalegne, B. (1982). Preliminary Observations on the Milk Production of Borana Cattle in the Southern Rangelands of Ethiopia. In *JEPSS Research Report* Addis Ababa: ILCA.

(17) Dessalegne, B. (1983). The Behavior of Free-Grazing Cows in Borana. In *JEPSS Research Memorandum* No. 7. Addis Ababa: ILCA.

(18) Dessalegne, B. (1984). Status report on smallstock and camel research in the Southern Rangelands Project. In *Grazing Resources Study Programme Protocols Nos. 3B and 3C, Interim Report.* Addis Ababa: ILCA.

(19) Dyer, J. A., Teshone, A., & Torrance, J. K. (1993). Agroclimatic profiles for uniform productivity areas in Ethiopia. *Water International* 18(4): pp.189-199.

[Cab Abstracts] The Uniform Productivity Areas (UPA) represent 13 district regions of Ethiopia. Monthly precipitation and potential evapotranspiration were compared to identify their effects on water supply and moisture stress. Results suggested a wide range in food production potential, some areas having rich land resources for food and cash crops. The shallow coarse-textured soils of the lowlands contributed to their low agroclimatic potential. Some regions with low rainfall were unsuited even for pastoralism. The climatic statistics used in this study were provided by a software package.

(20) Fekade, T. (1995). The role of small urban centres in the development of pastoral regions: the case of Negele town, Borena Region, Southern Ethiopia. *Regional Development Dialogue* 16(2): pp.85-96.

[Cab Abstracts] The pastoral regions of Ethiopia contribute significantly to the economy, yet the regions themselves are the most economically backward in the country, suffering a paucity of socioeconomic infrastructure and services, which hampers the export of livestock and livestock products. Capitalizing on existing livestock resources appears to be the best solution. Small urban centres could aid regional development in such regions by setting into motion mutually reinforcing local linkages between otherwise unintegrated urban and predominantly pastoral rural economies. The paper assesses the level of rural-urban interaction in the pastoral regions of Ethiopia, focusing on the Borena region. A preliminary identification and appraisal of the structure and dynamics of rural (regional) and urban economies is made, and the factors which explain the existing pattern of urban and regional development, and the roles small urban centres could play in the development of pastoral regions are identified. Also important in developing the pastoral resources is the role of service cooperatives in marketing, and the role of the state in livestock marketing. Unofficial trade in livestock, inappropriate pricing policies, limited marketing possibilities, poor domestic supply of basic consumer items, lack of transport and market-related infrastructure are, at least in part, the reason for the state of local/urban exchange. Negele (the capital of both Borena region and Liben wereda, a subdivision of the region) could prove useful by acting as a centre of demand for food and agricultural raw materials, providing the rural sector with the necessary technological and commerce-related services, and serving as an alternative destination for migrant rural labor.

(21) FAO (1982). Agrarian Reform and Rural Development in Ethiopia. Report on the high-level follow-up mission to Ethiopia. WCRRD Mission No.7, Rome 1982.

The report reviews policies in specific areas of development. The government policy of agrarian reform and rural development involving a redistribution of economic social and political power based on self-reliance and the people's participation is reviewed. On the land reform policies, it is agreed that the reform program has been successful in providing access to land to a majority of peasants with a greater degree of equality and participation. However, considerable differences are observed in the holdings of different peasant associations, creating a need for a further redistribution. The report also elaborates on structural aspects such as production structure and the integration of women in rural development. A comprehensive review of resource use, natural resource condition and policies affecting health, sanitation and food security in the country is also presented.

(22) Futterknect, C. (1997). Diary of a Drought: The Borana of Southern Ethiopia, 1990-1993. In: Pastoralists, Ethnicity and the State in Ethiopia, (ed.) Hogg, R. (pp. 169-182). London, U.K.: HAAN Publishing.

The author summarizes drought incidences between 1990 and 1993 on the Borana rangelands, stating the causes and outcomes both on the livestock and human populations.

Causes are attributed to failure of either the short or long rains, exacerbated by increased grain prices, outbreak of livestock or human diseases, political instability and tribal conflicts; necessitating emergence of relief programs. The livestock mobility, market situation and recorded proportions of livestock mortality during each drought incidence are briefly reported. The paper continues by commentating on the Borana traditional drought responses, coping mechanisms and lessons learnt from the Borana experience.

[Taken from the conclusion] The consequences of droughts in pastoral societies cannot ever be simply predicted. The scale and impact of the drought on both people and herds is mediated by many factors, in particular the wider socio-economic and political environment. The Borana case clearly shows that ecological factors are often the least important in determining the impact of droughts.

(23) Ghose, A. K. (1985). Transforming Feudal Agriculture: Agrarian Change in Ethiopia since 1974**.** Journal of Development Studies, 22 (1985): 128-149

The author briefly sketches the transformation process of the Ethiopian agrarian economy. He discusses the transitional agrarian structure brought about by the 1975 land reform process and the organization of the peasant association. The paper also evaluates the performance of the state farms, the general expansion of cultivated land, shifts in labor relations and the mechanisms used by the state to extract surplus from the peasants (various forms of taxation) which he compares to the tithe and tributes previously paid to the feudal landlords. It summarizes the problem of the peasantry in Ethiopia as that of a disparity between population growth and food production.

[Taken from the conclusion] Rural economy in Ethiopia is at crucial crossroads. The post-1974 agrarian reforms have created the necessary conditions for transformation but have not defined its precise path; this will be determined by policies pursued at this juncture. For this reason, future policies need to be based on a clear understanding of the nature of inter-relationships between *agricultural growth* and *institutional change* so that short run exigencies do not undermine long-run goals. Food supply per capita of rural population is extremely low and population is expected to grow at a rate of about three per cent in the foreseeable future. A rate of growth in food production of at least three per cent seems absolutely essential, and faster rates will be obviously desirable. It is tempting to make agricultural growth the overriding objective of development policy.

(24) Göricke, V. F. (1989). Agrarian Reform and Institution Building in Ethiopia. Forschungsstelle für Agrarentwicklung e. V., Ringstr. 19, 6900 Heidelberg.

The paper discusses the nationalization of the basic means of production. That is, the ownership of rural land. Rural land here is defined as all land outside the boundaries of a municipality or town. Göricke assesses the impact of the abolition of property rights on

the system of land use that has developed over the years and the role of the land lords that was -by implication- prohibited by the new proclamation of April, 1975. The idea behind the formation and implications of the peasant associations are also presented in detail. The paper continues by stating the relevant provisions of the 1975 land reform proclamation, discussing its implication for the landlords, peasants and traditional management institutions.

[Abstract from paper] After only three months in power, the 'Provisional Military Administrative Council' (PMAC) published a political philosophy of autochthonous Ethiopian Socialism. Essentially, this philosophy stressed the basic equality of all Ethiopians and the supremacy of the common good over individual gain. Here, the concept of self-reliance was to occupy a central position within future development policies. The economic objectives of this philosophy were to socialize the means of production for the purpose of eliminating the causes of social differences, and to make effective use of the country's productive forces for the common good. The ultimate aim was to create an independent and strong economy based largely on Ethiopian resources and capable of fulfilling the basic needs of the population.

The principles were worked out in greater details in the Provisional Military Administrative Council's declaration on economic policy. In this document it was stressed that material resources which were vital to economic development, and in particular those upon which people were dependent for their livelihoods, would have to come under public ownership and control. This nationalization of the key economic sectors would involve a major extension of public ownership to include land, which was the basic means of production within the most important key sector of all. This was a development, which directly affect the living conditions of the vast majority of the population. Approximately one month later this change was effected by the first piece of the land reform legislation.

(25) Gryseels G. 1988. The role of livestock in the generation of smallholder farm income in two vertisol areas of the central Ethiopian Highlands. In: Jutzi S C, Haque I, McIntire J and Stares J E S (eds). *Management of Vertisols in Sub-Saharan Africa*. Proceedings of a Conference held at ILCA, Addis Ababa, Ethiopia, 31 August – 4 September, 1987. ILCA (International Livestock Centre for Africa), Addis Ababa. pp. 345 – 358.

This paper examines the contribution of livestock to farm income in two vertisol areas of the Ethiopian Highlands: around Debre Zeit (1850 m altitude) and Debre Birhan (2800 m altitude). The data used in the analysis were obtained in a farm management survey of randomly selected smallholder farms in each area. Sale of livestock and livestock products contributes a significant proportion of farm cash income, ranging from 85% in the high-altitude zone to 35% in the medium-altitude zone. Livestock also provide approximately 50% of the farm gross margin, which increases to 60% if the value of draft

power is also taken into account. The annual rate of return on investment in livestock is estimated at 25% for sheep and 31% for cattle.

(26) Helland, J. (1982). "Social Organization and Water Control among the Borana." Development and Change 13: 239-258

The author provides a brief review of the Borana pastoral systems: human and livestock populations, tradition and water management systems. He reviews the Borana traditional administrative system and its contribution to pastoral life in the region. In particular, the traditional water sources and management system is thoroughly reviewed. Water is identified as the major constraint to traditional livestock production and a key determinant of seasonal access to pasture in Borana.

[Taken from the Paper] Sustained pastoral production in Borana depends on the balanced relationship between pasture, animals and humans. This paper has tried to show how the availability of water, and the social control mechanisms, which regulate this scarce resource, implies a control over the stocking rates of the Borana range. Other features of Borana social organization impose strict rules on human reproduction, resulting in a situation where manpower is in short supply in a society that is based on a labor-intensive economy. The major sanction underlying the Borana system of water control is, of course, exclusion from water. Failure to supply labor at the well and failure to participate in the politics of water will soon lead to exclusion from the well. … the basic contention of this paper is that the Borana live in a well-balanced ecological adaptation and that this balance is maintained by a complex social structure which is closely related to the regulation of access to, and utilization of, the critical water resource. Under the traditional circumstances of Borana pastoralism, the organizational forms of Borana society thus constitute an adequate adaptive solution. This has important implication for the planning of development in Borana.

(27) Helland, J. (1997). "Development Interventions and Pastoral Dynamics in Southern Ethiopia." In Pastoralists, Ethnicity and the State in Ethiopia, (ed.) Hogg, R.(pp. 55-80). London, U. K.: HAAN Publishing.

The author starts by discussing current views in the literature concerning resource management capabilities of pastoralists: adaptation to marginal environments or causes of resource degradation due to their desire to carry large numbers of livestock. He uses the Boran pastoral system -its customs, social organization and traditional livestock husbandry practices to present his views in the above debate. Traditional rules and regulations regarding access to pasture and water are presented, followed by a synoptic account of pastoral dynamics, traditional institutions and development interventions in the traditional resource management system of the Borana pastoralists.

[Taken from the author's conclusion] Water is a scarce resource in Borana and one of the most characteristic features of Borana pastoralism is the orderly and peaceful way in which the Borana organize access to it through the operation and maintenance of the wells. …. The organization of water use in Borana is not, however, primarily about resource management, but about maintaining the peace of Borana and the injunctions of *aada* (customs or traditions). The Borana are enjoined to behave in particular ways with respect to the wells to ensure the continued prosperity and well being of animals and people.

(28) Hogg, R. S. (1990a). An institutional approach to pastoral development: An example from Ethiopia. Pastoral Development Network No. 30d. London, U.K.: Overseas Development Institute.

The author presents a low cost participatory approach to pastoral development among Borana pastoralists of southern Ethiopia. He first presents a narrative account of the Borana society followed by a historical discussion, performance and future development of pastoralist cooperatives on the southern rangelands, and lessons of the pilot project experience in service cooperatives for other pastoral areas. The organization of pastoralists to better represent their interests to the state, among others, is identified as an important initiative to pastoral development. He concludes that an understanding of the Borana society, and in particular of resource management and territorial organization, is crucial to the design and implementation of development packages related to pastoralist cooperatives.

(29) Hogg, R., & Galle, N. (1993). From food relief to development: prospects for food monetization in eastern Hararghe and the Ogaden of Ethiopia. *Food for Development Discussion Papers* No. 7: pp.42.

[Cab Abstracts] Since 1992 the food situation in the eastern Haraghe and Ogaden region of Ethiopia has greatly improved, with a consequent fall in market prices. The overwhelming impression is of a vigorous market economy largely oriented to Somalia and the Gulf. There is no doubt that food relief has greatly contributed to trade flows, the general recovery of a devastated pastoral economy, and helped in the absorption of a large returnee population. However, the downside has been the encouragement of a drift to urban areas, the development of a culture of dependency, and the disincentive effects on local producers. It is clear that there should be more sensitive targeting of food relief to vulnerable groups, and some food monetization under specific circumstances. The present system of monetization is relatively efficient at spreading wheat grain throughout the area at fairly low prices for consumers, but the system is entirely dependent on supply and demand. There is little room for a general food monetization programme in the region at present, and in the context of reducing present levels of food aid, urgent action is required to develop local institutional capacity to identify, implement and manage feeding

programmes to provide a safety net for vulnerable groups.

(30) Holden, S. J. & Coppock, D. L. (1992). Effects of Distance to Markets, Season, and Family Wealth on Pastoral Diary Marketing in Ethiopia. Journal of Arid Environments, 23(3): 321-334

[Taken from paper] The authors conducted a peri-urban dairy marketing survey among households of Borana pastoralists in 1987. They showed that diary sales contributed about 20% to pastoral household income annually and that the sales peaked in the wet season and sharply in the dry season. Household closer to the market (10 km) were shown to sell sixteen times more than household far away from the market -more than 20 km away. Wealthier household sold more milk than poor house. Diary marketing contributes to food security by enabling regular purchase of grain at favorable terms of trade and delaying sales of livestock capital.

(31) Holden, S. J.; Coppock, D. L. & Assefa, M. (1991). Pastoral diary marketing and household wealth interaction and their implication for calves and humans in Ethiopia. Human Ecology, 19(1): 35-59

[Abstract from paper] Surveys of pastoral households in semi-nomadic Borana community in southern Ethiopia during 1987-1988 were used to test the hypothesis that poorer families living closer to market town would be most affected by the enhanced opportunity to sell diary products, which would intensify competition between people and calves for milk and have negative implications for calve management. The poorer families reported the highest rates of milk off-take per cow, and the milk increment was probably sold to purchase more grains for human consumption at the expense of milk intake for the calves. These findings together with calf morbidity and mortality data lend some support to a causal relation among factors of proximity to market, diary sales and risk of to calf health for poorer households. Diary marketing seems to be an appropriate survival strategy for poorer households, however it's associated short and long term risks (cuts in milk production and calf mortality and problems in human nutrition) should be reduced by appropriate interventions that create alternative income opportunities and improve calf feeding management.

(32) Leeuw, P. P. N., Rey, B., Gibon, A., & Flamant, J. C. (1994). A comparative review of diagnostic research in the Borana and Maasai pastoral systems in East Africa. In *The study of livestock farming systems in a research and development framework. Proceedings of the Second International Symposium on livestock farming systems, Saragossa, Spain, 11-12 September, 1992. 1994, 358-362; EAAP Publication No. 63.* Wageningen; Netherlands: Wageningen Press.

[Cab Abstracts] ILCA has conducted two systems studies with pastoralists in East Africa: the Maasai in Kajiado district in southeast Kenya, and the Borana in Sidamo province in Ethiopia. In this paper, an ex-post analysis is carried out of the learning process of studying livestock-dependent systems. The research planning and execution by ILCA teams in both areas are compared and the need for a flexible approach adjusted to the characteristics of each system under study is stressed.

(33) Lindtjorn, B., Alemu, T., & Bjorvatn, B. (1993). Dietary pattern and state of nutrition among children in drought-prone areas of southern Ethiopia. *Annals of Tropical Paediatrics* 13(1): pp.21-32.

[Cab Abstracts] To assess dietary habits and nutritional state in drought-prone areas of southern Ethiopia, 334 households in a pastoral and 282 in an agricultural community were studied. Milk and cereals were the main sources of food among children of the pastoral Boran in Dubluk, while cereals with limited supplements of animal products or legumes formed the main sources of food among children of the agricultural population of Elka in the Rift valley. Of the children in Elka, 54.9% were stunted, compared with 19.5% among children in Dubluk. Also, stunting occurred at an earlier age among the Elka children. Prevalences of wasting were less than 5% in both communities. Improvement in the state of nutrition of the pastoral children followed soon after the main rains, but occurred later and after the main harvest among the agricultural children. In contrast to arm circumference, the weight-for-height measure showed marked seasonal variation. Socioeconomic factors, such as family wealth and crowding, significantly influenced the state of nutrition among the children. Nutritional recovery following the prolonged drought among the agricultural children was slow and associated with families acquiring more wealth.

(34) Menwyelet, A., Coppock, D. L., & Detling, J. K. (1994). Fruit production of Acacia tortilis and A. nilotica in semi-arid Ethiopia. *Agroforestry Systems* 27(1): pp.23-30.

[Cab Abstracts] Dry, dehiscent fruits of Acacia tortilis provide important fodder for pastoral livestock in dry seasons on the central Borana Plateau, and fruits of A. nilotica may also be useful during drought. Information was needed on fruit yield to assess what these species could contribute to improved calf feeding systems based on local resources. Fruit production of 10 mature trees per species was measured at 5 sites for 7 months during 1988-9. Fruit yields varied according to site, season and species X site interaction (each at $P < 0.001$), but there was no main effect of species ($P = 0.13$). Yields were not correlated with stem diameter at breast height (DBH) or canopy area within or across species ($P = 0.05$ in all cases). Yields ranged from 0 to 40 kg DM per tree overall, with an average of 5.3 kg DM per tree (or 65 g DM/m2 of canopy area); this average tree had a DBH of 26 cm and a canopy area of 81 m2. It is concluded that low and highly variable fruit yields appear to constrain enhanced use of these species in this region. However, the

species warrant further attention in research and development, given their strategic value as forage resources in pastoral systems and their ability to persist in variable environments.

(35) Mwendera E J and Mohamed Saleem M A. 1997. Infiltration rates, surface runoff, and soil loss as influenced by grazing pressure in the Ethiopian highlands. *Soil Use and Management* 13: 29-35.

This study assesses the effect of grazing pressure on infiltration, runoff and soil loss on a natural pasture in Debre Zeit in the Ethiopian highlands during the rainy season of 1995. The study was conducted at two sites with 0-4% slope and 4-8% slopes. The grazing regimes were: light grazing stocked at 0.6 animal-unit-month (AUM)/ha; moderate grazing stocked at 1.8 AUM/ha; heavy grazing stocked at 3.0 AUM/ha; very heavy grazing stocked at 4.2 AUM/ha; very heavy grazing on ploughed soil stocked at 4.2 AUM/ha; and a control with no grazing. Heavy to very heavy grazing pressure significantly increased surface runoff and soil loss and reduced infiltrability of the soil. Reduction on infiltration rates was greater on soils that had been ploughed and exposed to very heavy trampling. It was observed that, for the same percentage vegetative cover, more soil loss occurred from plots on steep than gentle slopes and that gentle slopes could withstand more grazing pressure without seriously affecting the ground biomass regeneration compared to steeper slopes. It was concluded that there is a need for developing 'slope-specific' grazing management schedules particularly in the highlands rather than making blanket recommendations for all slopes.

(36) Mwendera E J and Mohamed Saleem M A and Woldu Z. 1997. Vegetation response to cattle grazing in the Ethiopian highlands. *Agriculture, Ecosystems and Environment* 64: 43-51.

The effect of grazing cattle on vegetation was studied on natural pasture during the rainy and dry seasons of 1995 in the Ethiopian highlands. The study used 0.01 ha plots established on 0-4% and 4-8% slopes. The grazing regimes were: light grazing stocked at 0.6 animal-unit-month (AUM)/ha; moderate grazing stocked at 1.8 AUM/ha; heavy grazing stocked at 3.0 AUM/ha; very heavy grazing stocked at 4.2 AUM/ha; very heavy grazing on ploughed soil stocked at 4.2 AUM/ha; and a control with no grazing. Light to heavy grazing did not affect the botanical composition of the vegetation at both sites, but very heavy grazing resulted in species normally less preferred by animals. Grazing did not have significant effect on ground vegetative cover on the 0-4% slope except at very heavy grazing pressure, but on the 4-8% slope even moderate grazing significantly reduced vegetative cover. Light to moderate grazing at the beginning of the dry period enhanced plant biomass productivity, while any grazing reduced plant productivity during the periods of reduced growth. Species richness increased with increasing grazing pressure compared with no grazing, but decreased sharply at very heavy grazing pressure. It was suggested that slope and time specific grazing management practices should be developed for the study area.

(37) Nicholson, M. (1983a). Sarite Cooperative Ranch: Cattle Growth and Production Characteristics 1981 and 1982. In *JEPSS Research Report* No. 11. Addis Ababa: ILCA.

(38) Nicholson, M. (1983b). Calf Growth, Milk Offtake and Estimated Lactation Yields of Borana Cattle in the Southern Rangelands of Ethiopia. In *JEPSS Research Report* No. 6. Addis Ababa: ILCA.

(39) Nicholson, M. J. (1987). The effect of drinking frequency on some aspects of the productivity of zebu cattle. *Journal of Agricultural Science* 108: pp.119-128.

> [Abstract] A 28 month trial was carried out under extensive grazing conditions to examine the effects of giving water to Boran cattle once daily, once every 2 days, and once every 3 days, with cattle having *ad libitum* access to water, serving as the control. In the dry season, the weight and condition of lactating cows given water every 3 days declined more rapidly than that of cows given water daily. Calving rates and birth were unaffected by treatments although when compared with cows given water *ad libitum*, birth weights were depressed by 2.5 kg in all treatments. Thirty steers showed no treatment differences in 28 month weights despite a depression in dry-matter intake in the dry season by animals given water every 3rd day. In contrast, 210-day weaning weights were significantly depressed by 9 kg when cattle drank water every 2 days and 14 kg when they drank every 3 days compared with calves given water daily. Total water consumed was depressed in all classes of stock by 5-10% under the 2-day regime and by 25-34% under the 3-day regime when compared with cattle given water daily. The results show that giving water every 3 days can be carried out indefinitely with all classes of stock with only minor effects on cattle productivity under the climatic conditions in which the trial was held. The management implications of giving water every 2 or 3 days to cattle under extensive, pastoralist and ranching conditions are discussed.

(40) Rahmato, D. (1993). "Land, Peasants and the Drive for Collectivization in Ethiopia." In Land in African Agrarian Systems, (eds.) Basset, T. J. & Crummey, D. E. (pp. 274 - 297). Madison, WI: The University of Wisconsin Press.

> The paper assesses the land policies of the Derg regime and delineates two phases: the first phase where the peasants played a significant role in state power consolidation and land reform process (between 1974 and 1978), and the second phase where the peasants and land itself became object of the government land reform policies. The policies were predominantly based on socialist modes of production and primarily designed to promote relationships with the socialist world. Such policies favored collectivization and a host of other agricultural and fiscal arrangements that, in whole or in part, helped to extend the frontiers of the state in the countryside. Collectivization, in the author's context, refers to group-based large-scale agricultural operations initiated or influenced by the state -rural

producer cooperatives and state farms. The paper continues by discussing the land reform and collectivization process; reiterating redistributive proclamations of the 1975 land legislation. The author briefly assesses the impacts of the proclamation on growth rate in the agricultural sector, population growth and self-sufficiency in food, comparing this period to the previous situation before the revolution. The performance of the private peasants is further compared to those of collectivization, state farms and peasant producer cooperatives.

The paper concludes: "the distinctive aspect of the rural policy of post-revolution in Ethiopia was that it provided rural producers access to land use, on the one hand, but denied them the opportunity to take advantage of its benefits, on the other. The central flaw of the land reform of 1975, which subsequent legislation did not attempt to correct, was its failure to provide peasant households with individual ownership and title deeds. All the other weakness of the reform, which in the aggregate negated the real benefit of the new land system, arose from this basic mistake. The nationalization of land was a poor substitute for the exploitative land system of the pre-revolution period, because the state was a more burdensome and more intolerant landlord and because ownership rights provided greater motivation and, above all, more security than usufructuary rights…"

(41) Rodriguez G and Anderson F W. 1988. A case study of risk-return tradeoffs in a mixed farming system in highland Ethiopia. *Agricultural Systems* 27: 161-177.

The role of livestock as a risk management option for smallholder farmers in an Ethiopian highland site, Debre Berhan, is examined. Specifically, the paper addresses the issue of whether livestock enterprises can be an income-stabilizing agent in a traditional mixed crop and livestock farming system representative of important parts of the Ethiopian highlands. The analysis is based on the application of a stochastic farm-firm linear programming model. Farm income is the stochastic variable in the model. Technological and resource constraints that approximate those of representative smallholders in the Debre Berhan area are incorporated into the empirical framework. Data are drawn from field surveys conducted from 1979-83 by ILCA. Linear programming solutions are obtained for situations where 1) traditional farm technologies apply; 2) farmers can use one ox, rather than the traditional pair, for cultivation; 3) farmers can keep a relatively high-yielding crossbred cow for milk production to raise cash income. The main empirical results are: 1) in the traditional farming system, increasing sheep flock sizes reduces income variation; 2) the single ox-traction technology offsets income variation by increasing mean income as a result of its higher efficiency as compared to the oxen-pair traction technology; 3) the adoption of the crossbred technology results in a lower income coefficient of variation due to its high mean income, but labor demand increases leading to a tendency for crop specialization.

(42) Tilahun, N. (1984). Household Economics Study in Borana and Estimation of Expenditure Elasticities from a Sample of Borana Households. In *JEPSS Research Report* No. 15. Addis Ababa: ILCA.

(43) Tilahun, T., Hadj, B., Barre, B., & Rahmato, D. From communal grazing to privatised enclosures: a case study of changing land tenure in Region 5. In *Land tenure and land policy in Ethiopia after the Derg: Proceedings of the second workshop of the land tenure project. Working papers on Ethiopian Development, No 8.* Dragvoll; Norway: Centre for Environment and Development, University of Trondheim.

> [Cab Abstracts] While most of Ethiopia underwent the massive changes of the 1975 Land Reform Proclamation, which nationalized rural land, much of the pastoral periphery remained largely untouched by such proclamations from the centre. Land in these areas continued to be administered by traditional law. Increasingly, however, with population increase and the expansion of the agricultural frontier, land use and tenurial arrangements in these areas are changing. The paper describes recent changes in pastoral land tenure and use in the southeast rangelands of the country. It is argued that 'communal' land tenure arrangements are increasingly changing in the direction of privatized range areas. The major symptom of this change is the growth in land enclosures associated with opportunistic agriculture. Data are presented from Region 5, an area that borders Somalia, and includes semi-arid and arid land. Increasing sedentarization is resulting in soil erosion and gullying, and there is now no communal grazing land left in Durwale region. The paper concludes that rather than try to stop this process it is better to try to improve conservation practices within the prevailing environment.

(44) Tolossa, G. & Asfaw, Z. (1995). Land Tenure Structure and Development in Ethiopia: A Case Study of Ten Peasant Associations in Wara Jarso Woreda. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ): Sector Project: Assistance to Desertification Control, Relevance of Land Tenure Development for Developing Countries (Division 425: 1995).

> The paper primarily assesses the national laws regarding tenure structure and land tenure policy. Land tenure structure and its historical development -*pre Derg, Derg* and *post Derg* periods- as regards livestock production is examined. Land reform programs in each period (redistribution etc.), its beneficiaries, perception of different stakeholders (landlords, land less persons, selected individuals etc.) and the role and mandate of local institutions, among others, is examined.
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> [Taken from the introduction] The objective of the paper is to provide a comprehensive assessment and analysis of existing land tenure laws, regulations, institutions involved and current status of development and perceptions at various levels. It further examines the impact of land tenure regulations at national and regional levels on land use at the

local level. The study is based on desk analysis of existing laws, interviews conducted with officials at different levels, and field surveys in ten peasant associations in Wara Jarso Woreda. The bulk of the report deals with findings at the field level, while analysis of the laws and perceptions of the individuals at national and state levels provide a broad framework against which local level tenure status and perceptions have been evaluated.

(45) Turton, D. (1995). Pastoral livelihoods in danger: cattle disease, drought, and wildlife conservation in Mursiland, South-Western Ethiopia. Oxford; UK: Oxfam Publications Department.

[Cab Abstracts] The report is the result of a field study carried out in northern Mursiland, Ethiopia in September 1994. The principle objective of which was to focus on the problem of cattle disease and to examine the scope for improving the access of Mursi pastoralists to veterinary services especially through the training of paravets. The views of the local herders on how the pastoral economy could be strengthened, without external intervention are presented. A secondary focus is the threat posed to pastoralists by government plans to encourage tourism in the Omo and Mago National Parks and to construct dams on the Omo for electricity generation. The report is divided into four parts. Part 1 is an outline description of Mursi economy and society. Part 2 is an account of herd structure and dynamics, based upon a single settlement of three herd owners. Part 3 focuses on the two major current constraints on Mursi pastoral production, disease and drought and on the potential threat posed by National Parks to best dry-season grazing areas. The final part considers how these constraints might be reduced by means of veterinary assistance and water development and by putting pressure on the wildlife authorities to change their existing approach to human activity in and around the National Parks.

(46) Wolde-Georgis, T. (1995). The limits of land reform implementation in resource poor societies: the case of Tigray, Ethiopia. *Scandinavian Journal of Development Alternatives* 14(1-2): pp.39-53.

[Cab Abstracts] A case study of Tigray, Ethiopia is presented arguing that there is a limit to the effect of land reform, even when it is egalitarian. In addition to pastoralism, peasant agriculture based on the plough culture has not changed for centuries. Very little land is irrigated and environmental deterioration such as soil erosion and deforestation is common. Before the introduction of land reform by the military government in 1975 the nobility and the church were the major land owners, as well as being dominant politically. The land reforms therefore not only distributed land to the peasantry, but also changed the power relations in the rural areas. Resources such as soil fertility and favourable climate, and inputs such as labour, fertilizer and technology must be available in order to bring about the reduction of poverty through increased agricultural output.

(47) Wolmer, W. 1997. Crop-livestock integration: the dynamics of intensification in contrasting agroecological zones: a review. IDS Working Paper 63, Institute of Development Studies, University of Sussex, UK. 29p.

> This paper considers crop-livestock integration as one of the key dynamics in the process of agricultural intensification. It traces the history of the 'mixed farming' concept and describes the conventional trajectory of integration of crop and livestock activities on smallholder farms as well as the key processes involved. Possible causal factors of crop-livestock integration, other than the Boserupian explanation of population growth, and alternative trajectories of change are explored. Drawing on case studies from Ethiopia, Zimbabwe and Mali the author concludes that an understanding of the strategies of differentiated social actors and the institutional arrangements that mediate access to resources is essential in any analysis of crop-livestock integration.

(48) Woodward, A., & Coppock, D. L. (1995). Role of plant defense in the utilization of native browse in southern Ethiopia. *Agroforestry Systems* 32(2): pp.147-161.

> [Cab Abstracts] Browse is an important forage in pastoral systems, especially during dry seasons, because it is high in nitrogen and digestibility. However, browse palatability may be reduced by possible plant defenses such as tannins and physical attributes. Chemical and physical properties of 20 browse species N. of Yavello, S. Ethiopia, were correlated with the feeding preference of camels, sheep and goats during wet and dry seasons in a densely wooded, semiarid savanna. Preference was assessed by comparing relative use with abundance of browse species. Chemical components included nitrogen, available nitrogen, acid-detergent fibre, in vitro digestibility, total tannins and condensed tannins. Physical defense included thorns, hooks, spines, and leaf surface properties. Animal preference was negatively related to chemical and physical defense factors, positively related to N content, and unrelated to fibre and digestibility, with results depending on animal species and season. Understanding the physical and chemical factors which influence browse selectivity aids in identifying promising forage resources.

(49) Yidego, L (1995). Summary Report on Land Use and Land Ownership Systems in Tigray with Special Reference to Forestry. Natural Resource Development and Environmental Protection Bureau, Tigray, Ethiopia: Report on the Tigray Tree Nursery Rehabilitation Project (Phase II: 1995).

> The paper reviews different land use systems in selected districts (woredas) in the Ethiopian highland areas and identifies current land use systems. Land use, land cover of the region is shown on maps and the relationships between traditional land use and forestry and livestock production systems are examined.

KENYA

(1) Ellis, J. E., & and Swift, D. M. (1988). Stability of African pastoral ecosystems: Alternative paradigms and implications for development. *Journal of Range Management* 41(6): pp.450-459.

> [Abstract] African pastoral ecosystems have been studied with the assumptions that these ecosystems are potentially stable (equilibrial) systems which become destabilized by overstocking and overgrazing. Development policy in these regions has focused on internal alterations of system structure, with the goals of restoring equilibrium and increasing productivity. Nine years of ecosystem-level research in northern Kenya presents a view of pastoral ecosystems that are non-equilibrial but persistent, with system dynamics affected more by abiotic than biotic controls. Development practices that fail to recognize these dynamics may result in increased deprivation and failure. Pastoral ecosystems may be better supported by development policies that build on and facilitate the traditional pastoral strategies rather than constrain them.

(2) Ellis, J. E., Coughenour, M. B., & Swift, D. M. (1993). Climate Variability, Ecosystem Stability, and the Implications for Range and Llivestock Development. In *Range Ecology at Disequilibrium: New Models of Natural Variability and Pastoral Adaptation in African Savannas,* (eds.) R. H. Behnke, I. Scoones, & C. Kerven, (pp.31-41). London, Oversease Development Institute.

> The authors begin with a discussion on trends in ecological theory. Using data collected during a decade-long study conducted in Turkana District of northern Kenya (Southern Turkana Ecosystem Project - STEP), they simulate the long-term behaviour of the study area ecosystem. From the results of this simulation they conclude that the area demonstrates non-equilibrial dynamics. The concluding section of this chapter suggests appropriate rangeland management strategies.

(3) Ensminger, J., & Rutten, A. (1991). The Political Economy of Changing Property Rights: Dismantling a pastoral commons. *American Ethnologist* 18(4): pp.683-699.

> A new institutional economics (NIE) framework is used to examine changes in the pastoral property rights system using the case of the Orma of northeastern Kenya. Economic growth, politics and, notions about fairness and justice are identified as factors that influence this process of change.

(4) Ensminger, J. (1996). Making a market: The institutional transformation of an African society. Cambridge: Cambridge University Press.

> [Abstract] This book analyzes the process by which the market was introduced into the economy of a group of Kenyan pastoralists, the Galole Orma of northeastern Kenya. The

author employs new institutional economic analysis to assess the impact of new market institutions on production and distribution, with particular emphasis on the effect of institutions on decreasing transaction costs over time. The effects of increasing commercialization on the economic well-being of individual households, rich and poor alike, is traced.

(5) Fratkin, E. (1986). Stability and resilience in East African pastoralism: The Rendille and the Ariaal of Northern Kenya. *Human Ecology* 14(3): pp.269-286.

The social organizations of two closely related nomadic pastoral societies of northern Kenya, the Rendille and Ariaal, are compared in the context of the relative constancy and variability of their herding environments. It is concluded that the application of Brooks and Yellen's model of stability and resilience in human populations is of value in understanding the impact of environmental constraints on social organization, but it is argued that other social features including the organization of labor and ownership of different livestock types directly bear on the differences between the Rendille and Ariaal.

(6) Galaty, J. G., & Johnson, D. L. (1990). Introduction: Pastoral Systems in Global Perspective. In *The world of pastoralism: Herding systems in comparative perspective,* (eds.) J. G. Galaty & D. L. Johnson, (pp.1-31). London, UK: Belhaven Press.

(7) Galaty, John G. (1992). "The Land is Yours: Social and Economic Factors in the Privatization, Sub-Division and Sale of Maasai Ranches." *Nomadic Peoples* 30: 26-40.

(8) Graham, O. (1988). Enclosure of the East Africa rangelands: Recent trends and their impact. *Overseas Development Institute* Paper 25a pp.1-11.

(9) Grandin, Barbara E. (1991). "The Maasai: Socio-Historical Context and Group Ranches." In Solomon Bekure, P.N. de Leeuw, B.E. Grandin and P.J.H. Neate (eds.), *Maasai Herding: An Analysis of the Livestock Production System of Maasai Pastoralists in Eastern Kajiado District, Kenya*. ILCA: Addis Ababa, Ethiopia, pp. 21-39.

(10) Hendrickson, D., Mearns, R., & Armon, J. (1996). Livestock raiding among the pastoral Turkana of Kenya: Redistribution, predation and the links to famine. *IDS Bulletin* 27(3): pp.17-30.

(11) Hogg, Richard (1987). "Settlement, Pastoralism and the Commons: The Ideology and Practice of Irrigation Development in Northern Kenya." In David Anderson and Richard Grove (eds.), *Conservation in Africa: People, Policies and Practice.* Cambridge: Cambridge University Press: 293-306.

(12) Homewood, K.M. (1993). "Development and the ecology of Maasai pastoralist food and nutrition." *Ecology of Food and Nutrition* 29: 61-80.

(13) Kerven C.(1992). Cusomary Commerce: A historical reassessment of pastoral livestock marketing in Africa. *ODI Agricultural Occasional Paper 15*. London, UK: Overseas Development Institute.

Kerven traces the changes in the relationship between various groups of pastoralists and the market. Specifically she looks at the changing patterns of livestock trading and marketing among the Samburu and Maasai of Kenya, and the pastoral Fulani of Nigeria and Niger. The main argument presented here is that pastoralists have a strategic approach to trading and marketing opportunities and this approach depends on their needs and/or advantages rather than on external persuasion or coercion.

(14) Linquist, B. J., Shiekh, M., Duba, Y., Fugicha, U., & Adolph, D. (1995). Caring for the poor, Gabra-style: indigenous relief and development strategies. *Appropriate Technology* 21(4): pp.6-8.

[Cab Abstracts] The article examines the mechanisms that have enabled nomadic communities to keep one another moving. The Gabra are a group of pastoralists who live in northern Kenya and part of southern Ethiopia. Their lifestyle is based on the herding of camels, small-stock and, to a lesser extent, cattle. Although the area they inhabit is one of the harshest and most arid in Kenya, they are able to make a productive living through their skilled herding and management strategies, which include a high degree of mobility, a highly coherent social structure, and hard work. A wealth-ranking exercise carried out by Intermediate Technology staff during 1994 and the Yaa Galbo, a project partner in Marsabit found the connection between wealth and livestock to be very strong. The discussion about relative wealth within the village demonstrated that the number of animals that a household owned, and the number of animals actually in their enclosure, are not directly related. The article uses a case study to illustrate the ways in which families share animals to ensure that the poorest in the village survive.

(15) Little, P. D. (1984). Critical Socio-economic Variables in African Pastoral Livestock Development: Towards a Comparative Framework. In *Livestock Development in Sub-Saharan Africa.* (ed.) J. R. A. E. Simpson, Boulder: Westview Press.

This review paper provides a useful categorization of the key socio-economic factors at work in pastoral economies.

(16) Little, P. D. (1985). Absentee herd owners and part-time pastoralists: The political economy of resource use in Northern Kenya. *Human Ecology* 13(2): pp.131-151.

Little provides a very insightful description of the changing structure of pastoralism among the Il Chamus who reside in Baringo District, northern Kenya. He suggests that the blame for the apparent conditions of overstocking and range degradation lies with the increasing pattern of absentee herd ownership rather than with the "true" pastoralists. His commentary provides a concise description: of the local economy and ecology, of the traditional dimensions of pastoralism, and of the institutions that regulated grazing patterns in the past.

(17) Little, P. D. (1987). Land Use Conflicts in the Agricultural/Pastoral Borderlands: The Case of Kenya. In *Lands at Risk in the Third World*, (ed.) P. D. Little & A. H. Michael (eds.), (pp.195-212). Boulder, Colorado: Westview Press.

(18) Little, P. D., Jaffee, S., & Morton, J. (1995). Merchants and middlemen in the cattle trade of southern Somalia. In *Marketing Africa's high value foods: comparative experiences of an emergent private sector*, (ed.) S. Jaffee, (pp.417-456). Dubuque, Iowa; USA: Kendall/Hunt Publishing Company.

[Cab Abstracts] The case study of cattle marketing in southern Somalia focuses on the unofficial cross-border trade with Kenya and demonstrates the inter-relatedness of domestic trading and official and unofficial exports. The analysis reveals that the orientation of export trade is highly contingent on economic and political factors that have led at times to reversals in trade flows. The relationships between different types of traders and their diversification strategies are examined in detail. The chapter begins by discussing the volume and general characteristics of trade in livestock from the arid and semi-arid countries of Northeast Africa and the Sahel. Following a discussion of the historic precedents of market crisis and instability in Southern Somalia, it goes on to suggest that: (i) dyadic and multiple relationships among livestock traders, often based on some form of material exchange are the norms during periods of both economic decline and relative prosperity; and (ii) economic differentiation among livestock merchants makes it difficult to generalize about trader behaviour without paying attention to differences in scale, access to markets and position in the market chain. Market channels are distinguished spatially and sociologically in order to demonstrate that certain groups of traders are associated with particular patterns of trade and geographic location. The chapter concludes with a discussion of the importance of social relations in marketing and the responses of traders to macroeconomic changes.

(19) Little, P. D. (1996a). Conflictive trade, contested identity: The effects of export markets on pastoralists of southern Somalia. *African Studies Review* 39(1): pp.25-53.

(20) Little, P. D. (1996b). Pastoralism, biodiversity, and the shaping of savanna landscapes in East Africa. *Africa London* 66(1): pp.37-51.

(21) Little, P. D. (1997). Maidens and Milk Markets: The Sociology of Dairy Marketing in Southern Somalia. In *African Pastoralist Systems: An integrated approach,* (eds.) E. Fratkin & K. A. Galvin, (pp.165-184). Boulder, Colorado; USA: Lynne Rienner Publishers Inc.

(22) Markakis, J. (1995). Conflict and the decline of pastoralism in the Horn of Africa. Basingstoke, UK: Macmillan Press Ltd.

> [Cab Abstracts] This is a reprint of the 1993 volume in which ten contributors depict the plight of pastoralists in the Horn of Africa through a series of case studies from Sudan, Ethiopia, Somalia and Kenya. They analyse the manifold causes of pastoralist marginalization and powerlessness. Furthermore, they examine the political implications of this condition and the pastoralist involvement in conflict. One of the dominant themes of the volume is the alienation of pastoralists from the states that claim them as their subjects. Pastoralist alienation in the Horn of Africa often fuels violent political conflict and is one of the challenges faced by the post-colonial state in this region. The rational for the reprint is the recent conflict in Somalia, which serves as a reminder of the issues raised in the first edition.

(23) McCabe, J. T. (1987). Drought and Recovery: Livestock Dynamics among the Ngisonyoka Turkana of Kenya. *Human Ecology* 15(4): pp.371-389.

> This paper examines how a drought experienced in the Turkana District during 1979-1981 affected the livestock management systems of the Ngisonyoka Turkana, and how these systems responded to the drought conditions in the 1980-1985 time period. The data concerning how drought affects livestock production systems were collected from four herd owners; while information relating to herd recovery was obtained from one herd owner. The data were collected and analyzed separately for each livestock species (cattle, camels, sheep and goats) as they respond differently to drought conditions. From his analysis, the author suggests three phases through which the effects of drought and the process of herd recovery occur, as follows: first there is a significant reduction in herd size; second, a stabilizing period with low calving and low mortality rates, and; third a recovery period shown by a rapid increase in animal numbers.

(24) McCabe, J. T. (1990). Turkana Pastoralism: A Case Against the Tragedy of the Commons. *Human Ecology* 18(1): pp.81-103.

> In this paper, McCabe provides a very insightful discussion of the ecological balance existing in the Turkana area; and how Ngisonyoka social institutions function to control access to, and utilization of, natural resources thereby maintaining this balance. From McCabe's presentation, three important points can be drawn. Firstly, what appears to be an irrational practice of livestock accumulation, is actually an opportunistic pastoralist

management strategy to cope with recurrent droughts in semi-arid regions when cattle losses will be inevitable. Secondly, pastoral groups appreciate the need to preserve their resource base; thereby they have in place various social institutions that protect their resource base from overexploitation. Thirdly, besides these institutions there exist environmental phenomena such as recurrent droughts that serve to control livestock populations from exceeding the carrying capacity of the land.

(25) McCabe, J. T., Fratkin, E., & Roth, E. A. (1994). Mobility and land use among African pastoralists: old conceptual problems and new interpretations. In *African pastoralist systems: an integrated approach,* (eds.) E. Fratkin & K. A. Galvin, (pp.69-90). Boulder, Colorado; USA: Lynne Rienner Publishers Inc.

[Cab Abstracts] The chapter reviews some of the major issues and theoretical debates concerning pastoral land use with particular reference to the Turkana of Kenya. A literature review on pastoral land use is followed by data concerning Turkana pastoralists collected as part of the South Turkana Ecosystem Project in 1984-85. During the late 1970s and throughout most of the 1980s, much of the literature related to African pastoral peoples emphasized the failure of pastoral economies; the impact of drought; and the rapid social, economic and political change deriving from development initiatives. In the 1980s this perception changed and pastoralists were pictured as rational in their organizational decisions operating a viable, healthy agricultural economy, and utilizing a harsh ecosystem in a very effective manner. The case study examines pastoral mobility among a single group of pastoralists from a population-level and an individual perspective. It is concluded that the mobility patterns of pastoralists are seen as both unpredictable and yet regular and orderly, depending on the method of analysis used. Attempts to order the importance of each factor in the decision making process are futile. All decisions concerning movement involve a complex process of evaluating environmental, political, and social factors. Sometimes the principle motivation is clear, but it is questionable if any analytic utility is gained by trying to assign primacy to any one factor.

(26) Mullins G, Wahome L, Tsangari P and Maarse L. 1996. Impacts of intensive dairy production on smallholder farm women in coastal Kenya. *Human Ecology* 24: 231-253.

The welfare impacts of an intensive dairy technology package, comprising of crossbred cows, cultivated fodder and recycling of nutrients from animal slurry, on women and their families are investigated on 32 smallholder crop-livestock farms in the sub-humid zone of Kilifi district, Coast Province of Kenya. Farms were stratified according to male or female extension contact. Across all farms, women performed half of all dairy-related activities but only on female contact farms did income from the dairy enterprise accrue to women in proportion to their labor input. There was broad consensus among the women interviewed that intensive dairying has led to improved household welfare, primarily

through increased household income and milk consumption. But these gains were achieved at the expense of more work for women. Recommendations for design and delivery of livestock technologies with special emphasis on how to minimize negative impact on vulnerable household members are inferred from study findings.

(27) Oba, G. (1994). The role of indigenous range management knowledge for desertification control in Northern Kenya. In *Research Report Environmental Policy and Society (EPOS)* No. 4. Uppsala University.

(28) Probert M E, Okalebo J R, Simpson J R and Jones R K. 1990. The role of boma manure for improving soil fertility. In: Probert M E (ed). *A Search for Strategies for Sustainable Dryland Cropping in Semi-Arid Eastern Kenya*. Proceedings of a Symposium held in Nairobi, Kenya, 10-11 December 1990. ACIAR Proceedings No. 41. Australian Centre for International Agricultural Research, Canberra, Australia. pp. 63-70.

This paper outlines the system used by farmers in the Machakos district of Kenya to keep their animals and manage the manure on their farms. It reviews previous studies in the region on the effectiveness of manure as sources of nutrients for crops, and presents results for the amount and quality of manure being applied by farmers and the accumulation of nutrients beneath the boma (i.e., small enclosures where animals are kept).

(29) Roth, E. A. (1996). Traditional pastoral strategies in a modern world: an example from Northern Kenya. *Human Organization* 55(2): pp.219-224.

(30) Rutten, M. (1995), The Tragedy of Individualizing the Commons: The Outcome of Subdividing the Maasai Pastoralist Group Rances in Kajado District, Kenya, paper presented at "Reinventing the Commons", the Fifth Annual Conference of the International Association for the Study of Common Property, May 24-28, 1995, Bodoe, Norway.

[from IASCP abstracts] In Africa, the early 1980's showed a switch to the adoption of the individualization of land ownership and a shift away from other policies such as the socialization of land or adaptation of customary tenure. Also in Kenya, calls for subdivision of group ranches grew louder. Supporters of a subdivision state that it will raise standards of living, boost the ability to procure a loan, minimize the exploitation of the poor by rich households, and facilitate better maintenance of the existing infrastructure. The Maasai ranches were considered to be a failure they the authorities in that the main objective of de-stocking the pastures was not met. In general, those opposing subdivision claim that the ultimate result will be the alienation of land to non-Maasai, the creation of severe erosion in areas where cultivation is to start, and the restriction of the movement of livestock. The analysis of a group of 500 households showed that land subdivision has been most favorable to the most powerful. Whole

groups of Maasai pastoralists have been excluded. Still, only a mere 10 percent have a sufficient large parcel during the dry season. Land sales to outsiders worsened this situation by a reduction of the area available and by buying of animals, using the proceeds of the land sales. These outsiders fence off their land for cultivation or act as absentee landowners interested in speculation only. Nowadays government officials and the World Bank judge the initial outcome of group ranch subdivision to be disastrous.

(31) Stiles, Daniel (1992). "The Gabbra: Traditional Social Factors in Aspects of Land-use Management," *Nomadic Peoples* 30: 41-52.

SOMALIA

(1) Behnke, Roy (1986). The Implications of Spontaneous Range Enclosure for African Livestock Development Policy. African Livestock Policy Analysis Network Network Paper No. 12.

Behnke considers four questions regarding range enclosure in contemporary Africa: (i) why does range enclosure occur; (ii) under what conditions are they harmful or beneficial; (iii) can these movements be controlled; and (iv) what do these changes imply for the long-term development of the African livestock industry. Behnke addresses these questions with reference to four range enclosure movements -- two in the South Darfur Province of western Sudan and two in the central rangelands of Somalia.

In South Darfur there is range enclosure in two areas. One is an area around the town of Nyala where farmers are enclosing land in order to protect and sell fodder into the Nyala market. The second is in an area where fodder is contested between year-around residents and seasonal transhumants (similar to the case of the Orma in Kenya, see Ensminger). Most of the large private enclosures are held by the larger and wealthier herd owners who can afford the cost of fencing.

In central Somalia there has been range enclosure in the agro-pastoral zone and in the pastoral zone. In the agro-pastoral zone, range enclosure was stimulated by the development of five boreholes in the area. Enclosure in this area is supported by traditional usufruct rights to cropland that is protected by thorn fencing. The development of the boreholes increased the competition for cultivated land in the vicinity of the boreholes and may also have prompted some speculative enclosure, with people anticipating future increases in land pressure. The traditional rural political system that protected common lands was also in a state of decline at the same time.

In the nomadic zone of Somalia, enclosure around el-Buur town was stimulated by: (i) drought of the 1970s that increased the relative value of the good pastures around el-Buur

town; (ii) national agricultural policy that favoured cultivation; and (iii) the interests of particular decent groups to enclose the best pastures while still using the common pastures.

Overall, Behnke concludes that individuals will fence common pastureland when they judge enclosure to be practical and profitable. Particular plots of land may also acquire a scarcity value that is relative to other resources; this relative value may increase due to climatic conditions that reduce the supply of all grazing resources in an area. National policies and the strength of local institutions make it easier or more difficult for individuals to defy customary rules.

(2) Unruh, J. D. (1995). The relationship between indigenous pastoralist resource tenure and state tenure in Somalia. *Geojournal* 36(1): pp.19-26.

[Cab Abstracts] Indigenous resource tenure systems in Africa have evolved to meet the constraints and opportunities of often difficult biophysical environments, while facilitating the operation of complex spatial and temporal land use patterns. Traditional systems provide security of tenure in culturally relevant ways that permit adaptation to new circumstances. On the other hand, imposed tenure structures in Africa have often not strengthened individual rights and have often blocked indigenous tenure development and adaptation in response to new situations. Pastoralists in Africa have in particular been negatively affected by the imposition of national tenure systems which in many cases have served to marginalize nomadic populations, with repercussions in land degradation, food security, and instability. In Somalia the transient resource rights and resource use arrangements that are critical to transhumant pastoralism were ignored in the formulation of the national tenure regime which favoured crop cultivation. The results were increased land degradation, resource use conflicts, declines in pastoral production, and impacts of Somali clan alliances which in many cases regulate rational resource access and use. Somalia possesses the greatest proportion of pastoralists in Africa. Transhumant pastoralism, as the most widespread agricultural enterprise in the country, will play a critical role in food production for the foreseeable future. However, the relationship between indigenous pastoralist tenure and state imposed tenure has, in many locations decreased the ability of pastoralism to reproduce itself, thereby compromising the rational utilization of very large areas of rangeland interior, which have very few alternative uses.

THE END