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THE DEVELOPMENT OF NOMADIC PASTORALISM IN AFRICA
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ABSTRACT

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Keywords: nomadism, pastoralism, Africa, drylands, utilization strategies, rangeland ecology

The purpose of this thesis is to investigate adaptations to a highly unpredictable bio-physical and socio-economic environment of African nomadic pastoral utilization systems in the past, the present, and the future. This is done with respect to three main themes: availability and use of range and water, tenure systems, and exchange and market relations. The thesis is based on the recent paradigm shift within ecological and economic studies of nomadic pastoral societies and their environments. Within the new paradigm arid and semi-arid ecosystems are perceived as being in permanent disequilibrium, and many of the pastoral strategies are seen as carefully adapted to this. The study is theoretical in the sense that it does not include results of new field studies or any original data material, it builds on other authors’ theories and results. It is an attempt to provide an overview of the vast material within the field and is based on case studies from different parts of Africa.

The study includes a brief review of the origins and spread of nomadic pastoralism in Africa. As far as the origins are concerned it appears that pastoralism has originated in the Sahara region c. 7-8000 BP, but pastoralism is assumed to have had many origins in different places, at different times. Thus, both agriculture and hunting can have preceded pastoralism in Africa. It appears, however, that pastoralism in the Sahara region has originated from hunting. Pastoralism had its first appearance in East Africa c. 3-4000 BP, while pastoral utilisation systems can be detected from about 2000 BP in southern Africa.

It is argued that when range and water are abundant, competition mainly concerns the high productivity areas. However, population growth has increased pressure on and competition for most resources. Encroachment of agriculturalists on pastoral key resources has hampered the flexible strategies of the pastoral utilization system. There is no doubt that this pressure will continue in the future; hence, the access to range and water should be secured. This can be done by establishing watering points in under-exploited areas, by increasing dry season feed production, or by importing fodder for livestock in the dry season.

The customary tenure systems appear to have been adapted to the pressure on the resources. Most customary tenure systems have allowed for flexible strategies by employing a number of different rights e.g. access rights, usufruct rights, priority rights. Many of these systems have been destroyed in the colonial and post-colonial period, as the legislation has emphasized property rights. Along with the paradigm shift there has been an emerging understanding of the need for flexible tenure arrangements, and the customary systems are therefore being reconsidered.

The study examines the different exchange and market relations that have existed as far back as the records show. At first, these relations were based on simple barter of agricultural and pastoral products; later, trading routes enhanced the exchange between pastoralists and other societies. In the Sahara many of these traders were nomadic pastoralists. The most important change in recent times was the arrival of the colonial powers. The impact of colonialism was profound; although pastoralists tried to adapt to the new situation it turned out to be difficult, and they were marginalised in most cases. The variable socio-political environment require flexible behavioral adaptations. It appears that involvement in the market economy can enhance pastoral production, although so far an increased market orientation has caused a polarization of pastoral societies.

This thesis documents that the nomadic pastoral utilization system is a cultural adaptation to a highly variable and unpredictable natural environment. Moreover, the system’s behavioral adaptive strategies have enabled it to cope with an unpredictable socio-political environment. The study concludes that nomadic pastoralism is a viable utilization system and will continue to be so in the future, as long as the following elements are ensured: maintenance of mobility to allow optimal use of the heterogeneous environment, secured access and rights to key grazing and water resources, and flexible responses to uncertain events.
RESUME

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Udviklingen af nomadisk pastoralisme i Afrika

Geographica Hafniensia C6

Nøgleord: nomadisme, pastoralisme, Afrika, aride områder, udnyttelsesstrategier, græsningssystemer


Studiet indeholder et kort beskrivelse af oprindelsen og spredningen af nomadisk pastoralisme i Afrika. Hvad oprindelsen angår, lader det til at pastoralism er opstået i Sahara området ca. 7-8000 fvt. Pastoralismen formodes at være opstået flere forskellige steder på forskellige tidspunkter. Således kan både agerbrugere og jegere have gået forud for pastoralister i Afrika, men det forekommer sandsynligt at pastoralisme i Sahara regionen er opstået på baggrund af en jægerkultur. De første tegn på pastoralisme i Østafrika stammer fra ca. 3-4000 fvt, mens det pastorale udnyttelsessystem først nåede det sydlige Afrika omkring 2000 fvt.

Så længe der er rigelig adgang til land og vand, er konkurrencen koncentreret om de høj produktive områder. Befolkningsvæksten har medført et stigende pres på og konkurrence om de fleste ressourcer og specielt om de høj produktive områder, endvidere har indtrængende agerbrugere begrenset de fleksible pastorale strategier. Der er ingen tvivl om, at dette pres vil fortsætte i fremtiden, derfor bør adgang til jord og vand sikres. Dette kan gøres ved at etablere vandhuller i underudnyttede områder, ved en stigende primær produktion i tørtiden, eller ved at importere fodder for dyrerne i tørtiden.

De traditionelle rettighedssystemer fremtræder som tilpassede til presset på ressourcerne. De fleste traditionelle rettighedssystemer har tilladt fleksible strategier gennem anvendelse af forskellige typer af rettigheder såsom adgangsret, brugsret, prioriteret ret. Mange af disse systemer er blevet ødelagt i eller efter kolonitiden, hvor lovgivningen har prioriteret ejendomsret. Sammen med paradigmekiflet er der kommet en stigende forståelse for nødvendigheden af fleksible rettighedssystemer og de traditionelle rettighedssystemer bliver derfor taget op til fornyet revision.


De variable socio-politiske omgivelser kræver hurtige, fleksible tilpasninger. Involvering i markedssystemen lader til at kunne fremme den pastorale produktion, dog har en stigende involvering i markedet resulteret i en polarisering af de pastorale samfund.

Dette speciale dokumenterer, at det nomadiske pastorale udnyttelsessystem er en kulturel tilpasning til et meget varierende og uforudsigeligt naturligt miljø. Endvidere har systemets hurtige, fleksible tilpasninger gjort det i stand til at klare sig i et uforudsigeligt socio-politiset miljø. Det kan konkluderes, at nomadisk pastoralisme er et levedygtigt udnyttelsessystem og vil fortsætte med at være i fremtiden, hvis de følgende elementer sikres: Vedligeholdelse af mobiliteten for at sikre optimal udnyttelse af de heterogene miljø, sikret adgang og ret til nogleområder med græs og vandressourcer, og mulighed for fleksible reaktioner på ukendte begivenheder.
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Chapter 1

INTRODUCTION

Nomads have always attracted attention far out of proportion to their numbers. The study of nomadic pastoralists has been the subject of considerable scholarly attention. Nomads appear to represent our image of the “noble savage” and have thus long been viewed in a romantic light (Dyson-Hudson & Dyson-Hudson 1980). This image derives to a large extent from the first European accounts of meetings with nomadic pastoralists. Hereafter, nomadic pastoral societies came to serve as examples of “traditional societies” especially for anthropologists. Nomads appeared isolated and independent; their periodic spatial migrations and specialised economy gave them this reputation (Galaty 1981a). In particular the Maasai have become somewhat legendary in anthropological literature. They, among other nomadic pastoralists of East Africa, are portrayed as happy cattle herders and warriors, who have managed to maintain an egalitarian society as well as independence from the outside world (Ndagala 1992).

The first major studies of nomadic pastoralists attempted to understand their specialised subsistence economy and their migrations. Before 1960 few studies of African nomadic pastoralists were published. In the main these were carried out by anthropologists such as Evans-Pritchard (1940) on the Nuer, Gulliver (1955) on the Jie and the Turkana, and Stenning (1959) on the Fulani. Evans-Pritchard’s study was especially important inspiration to many scholars, and his theoretical framework has been widely acknowledged. After 1960 scholarly interest increased, and most studies applied new theoretical approaches and methods to the study of nomadic pastoralists, for example Dyson-Hudson (1966) on the Karimojong, Lewis (1961) on the Somali, and Nicolaisen (1963a) on the Tuaregs. Although many studies have followed since then, few have been theoretical or concerned with a general description of nomadic pastoralist societies (see for instance Sandford 1983, Scholtz 1995).

In development projects, nomadic pastoralists have been approached in a similar way to agriculturalists, and their arid ecosystems have been perceived as similar to temperate ones (Butcher 1994). Much effort has been spent on projects trying to settle nomadic pastoralists and persuade them to cultivate (Hitchcock & Hussein 1987). In the last decade understanding of nomadic pastoral societies and arid ecosystems has changed with the growing body of case studies and development reports. Meanwhile, the proportion of migrating pastoralists is declining (Sandford 1983, Hiernaux 1996). It might therefore seem unnecessary to keep studying them. However, the arid and semi-arid areas utilised by the nomadic pastoralists do not disappear with the pastoralists or turn into fertile agricultural land. If these areas are to be utilised, a sound system is

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1 Barfield 1993 p.ix.
2 It should be noted that this depends on the period examined as well as the location discussed. However, in most African countries the number of people pursuing a nomadic pastoral way of life has declined in spite of the natural population growth (Sandford 1983). Furthermore, there is evidence that the number of animals kept by nomadic pastoralists is declining, while the number kept by sedentary people is increasing (Bayer & Waters-Bayer 1995).
needed, which nomadic pastoralists seem to have developed. However, the question that emerges from this is: can this utilisation system persist in the future?

This thesis examines African nomadic pastoralists and the areas they inhabit. It is an attempt to draw together the material within the field and outline scenarios for the future of nomadic pastoralism through an investigation of many individual studies. The approach will be ecological\(^3\) and will focus on key issues concerning the utilisation system\(^4\). Central to this is the study of the nomadic pastoral utilisation system in an historical perspective in order to evaluate the adaptability of the system.

### 1.1 Scope

In order to investigate the adaptation of the nomadic pastoral utilisation system in the past, the present, and the future the thesis will address the following questions:
1. What are the origins and spread of nomadic pastoralism?
2. How has nomadic pastoralism adapted to changes in the past?
3. How is nomadic pastoralism adapting to present changes?
4. How can nomadic pastoralism adapt to changes in the future?

In this context the definition of adaptation is crucial. The anthropologist Bennett\(^t\) has provided the best definition for the present purpose: according to him, adaptation ‘is focused on action, and it is neutral on the definition of environment. It refers to the coping mechanisms that humans display in obtaining their wants or adjusting their lives to the surrounding milieu, or the milieu to their lives and purposes’ (Bennett 1976 p.246). Hence, it refers not just to human adaptation to the environment, but also to the dynamic interaction between the nomadic pastoral utilisation system and the environment it occupies, as well as to the interaction with the surrounding society. The latter includes trade and exchange arrangements. Human adaptation will be discussed in chapter 2.

Given the constraints of space the thesis is not exhaustive, but will concentrate on principal types of adaptation to changed conditions. Question 2-4 will be answered with respect to three main themes:

- Availability and use of range and water
- Tenure systems\(^5\)
- Exchange and market relations

Common to these interrelated themes are the facts that they all evolve around management of the nomadic pastoral utilisation system and that they all include the relationship between the nomadic pastoralists and the surrounding world. The reason for choosing these three themes will be elaborated in chapter 3.

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\(^{3}\) The approach is explained in chapter 2.

\(^{4}\) A definition of utilisation system is provided in appendix 2.

\(^{5}\) In this context tenure systems are defined as including all kinds of rights (e.g. access right, usufruct right, etc.) to the resources within an area.
1.2 Delimitation

This thesis is about nomadic pastoralists; hence, pastoralists practising transhumance\(^6\) or agropastoralism\(^7\), and sedentary livestock keepers will only be mentioned when relevant to the context. As the thesis is concentrated around three themes other issues will only be touched upon when relevant. It is only left to note that issues such as health and nutrition, climatically-induced environmental changes, gender relations and the impact of schools, however important these issues might seem, are not considered here.

In geographical terms the study concentrates on Africa. Three main reasons can be identified for this:

- Despite a wish to apply a very general approach and look at all nomadic pastoralists in the developing countries, this was not possible. Moreover, pastoralists in certain parts of the world exist under very different circumstances influenced by political history, cultural development, physical environment etc.
- Examination of the literature makes clear that most of the general works are geographically limited, for example, *Pastoralism in Africa: Origins and Development Ecology* (Smith 1992), *African Pastoralist Systems* (Fratkin et al. 1994) and *The Origins and Spread of Agriculture and Pastoralism in Eurasia* (Harris 1996). It therefore seems practical to choose one region.
- Although each nomadic pastoral group has its own unique pattern of movement, herd composition, etc., there are some similarities within the African continent. Movement, for instance, is usually determined by the change in dry/wet seasons as opposed to summer/winter movements as, say, in the Hindukush.

As far as time is concerned the focus of this study is from the origins of pastoralism until today with some recommendations for the future as well. However, the emphasis will be on the past century and the present.

A considerable amount of literature on nomadic pastoralism in Africa exists, therefore it is necessary to make a selection. Apart from selecting the most relevant information, emphasis is given to English literature and translated French literature due to the authors comparative advantages in reading English.

1.3 Terminology

As the study is based on the fieldwork of many authors it is necessary to be very accurate in the use of terms. Most terms are either explained/defined in the text or can be found in appendix 2. The definitions will be established according to the following (based on Ackoff et al. 1962):

- to examine existing definitions within the field of study
- to identify the core within these
- to prepare a tentative definition on the background of the above mentioned
- to ensure that the definition makes sense in the context or to revise it

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\(^6\) Refer to appendix 2 for a definition of transhumance.
\(^7\) Refer to appendix 2 for a definition of agropastoralism.
In the literature the terms **nomadic pastoralism** and the **pastoral nomadism** are used. Some researchers use the terms randomly (e.g. Barfield 1981). Others choose one of them without further explanation of the concept\(^8\). The former theory places the emphasis on the pastoral perspective i.e. on animal husbandry, whereas the latter emphasises the nomadic perspective, i.e. the mobility. In this context, the pastoral aspect is the most important aspect; pastoralism is the subject that should be discussed in terms of the degree of mobility and not the other way round. Thus, the term **nomadic pastoralism** is applied. In the present context a pastoralist refers to a person who, by personal participation, derives a substantial part of his livelihood from animal husbandry by using much land in relation to other resources. Further, the livestock production is mainly for subsistence and only a small amount is used for exchange or trade (based on Sandford 1976a p.3). Hence, a **nomadic** pastoralist refers to a pastoralist who uses migration as a means of providing feed for his livestock.

A second term that needs explanation is **rangeland**\(^9\). In the present context this refers to large non cultivated areas in the arid or semi-arid zone. The vegetation is a combination of annuals, perennials and ephemerals; it is natural vegetation, though often influenced by grazing of wild and/or domestic animals. Rangelands can be fenced or open, and there may be both natural and man-made watering points. The term rangeland is preferred to the term grassland, because it does not indicate the vegetation composition. The term pasture can also be used instead of rangeland, but pasture indicates a specific use of the land whereas rangeland is a description of the landscape type. Moreover, the term pasture can also connote sown grasslands, which the term rangeland cannot. Hence, the term rangeland appears neutral, which is important for later discussions, and the term pasture is therefore only used to describe rangeland utilised for livestock feed.

### 1.4 Thesis structure

The thesis is divided into two parts. The first part provides background information and the second part offers an analysis based on selected materials. Chapters 2 and 3 on the characteristics and ecology of nomadic pastoralists and their environment provide a context for the study, all the more, because there has been a paradigm shift within the understanding of how arid and semi-arid ecosystems function and of the rationality of nomadic pastoralism. Therefore it seems useful to detect how this change in views has come about and to see how the characteristics of these ecosystems and utilisation systems are interpreted today. Chapters 4 - 7 provide an analysis of the origins and adaptation of nomadic pastoralism. The analysis should be seen in the light of the paradigm shift. The thesis is structured as follows:

**Chapter 2** provides a literature review and outlines the theoretical framework. The literature review emphasises changes in anthropological literature and the paradigm shift within ecological and economic literature. The theoretical approach emphasises

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\(^8\) Refer to appendix 2 for a more thorough discussion of the various definitions of nomadism and pastoralism.

\(^9\) Following FAO and ODI arid and semi-arid rangelands are defined as areas where the precipitation is too low or erratic to support forestry or permanent cultivation on a continuing basis, except in localised situations or with the aid of irrigation (Sandford 1976a p.3).
human adaptation and ecological frameworks, and finally the approach applied in the thesis is described.

**Chapter 3** outlines the basic characteristics of arid and semi-arid areas, and of the nomadic pastoral utilisation system. Classifications of nomadic pastoral societies/production systems are discussed, and finally the reasons for choosing the three main themes are explained.

**Chapter 4** discusses the origins and spread of nomadic pastoralism in Africa. The reason for starting so far back is that the adaptability of this utilisation system is hard to understand without reference to its origins, spread and development.

**Chapter 5** uses three main themes, namely availability and use of range and water, tenure systems, and exchange and market relations, to start the analysis. According to these themes the rationale of nomadic pastoralism in the past is outlined. Emphasis is given to the colonial period and how this has changed the adaptation of nomadic pastoralism.

**Chapter 6** concerns the rationale of nomadic pastoralism today. It builds on chapter 5 and follows the three main themes. Emphasis is given to the impact of direct (e.g. development projects) and indirect (e.g. commercialisation) development, and to the pastoralists’ ability to deal with drought.

**Chapter 7** discusses the adaptation of nomadic pastoralism in the future; again the material is analysed according to the three main themes. Some scenarios of nomadic pastoralism in the future are provided. These include a model showing changes in the nomadic pastoral utilisation system.

**Chapter 8** concludes the results and evaluates the study.

The **appendix** contains:

- a map of arid and semi-arid areas in Africa
- explanation of terminology
- a list of abbreviations
Chapter 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Our view of the world, or our perception of any system, has a great deal of influence on how we go about dealing with that system.

The intention of this chapter is to provide a literature review and to outline the theoretical framework for the thesis. The literature review is important for the understanding of the theoretical framework as there have been paradigm shifts within the study of nomadic pastoralism. The first was within anthropology in the late 1960s early 1970s; the second was within range ecology and economy about 20 years later. Although the former influenced the latter, this was only in an indirect manner, whereas the change in theoretical framework within range ecology and economy had a direct influence on the theories of pastoral economies and thus caused an overall paradigm shift within the study of nomadic pastoralism. While the paradigm shift in anthropology only had a slight influence on the development proposals, the paradigm shift 20 years later continues to have a major impact on development agencies’ policies on nomadic pastoralism. The final results of this are still to be seen.

For obvious reasons the theoretical framework of this thesis builds upon these changes. The theoretical framework consists of a presentation of the ideas of human adaptation, an overview of ecological approaches, and finally, the approach of the thesis is explained.

2.1 Literature review

The literature within the field of nomadic pastoralists and the environments they inhabit is extensive. Although many of the publications are interdisciplinary, it is useful to divide the literature up into some main groups: anthropological, ecological and economic. Along with these come development proposals, reports etc.; however, these are only used to a limited extent in the present case and will therefore be included in the groups mentioned. The literature is divided into these groups because the approaches applied are very different, as will be apparent later.

It should be noted that the majority of the literature on nomadic pastoralists is based on field studies and thus is often more specific than general in its approach.

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1 Ellis & Swift 1988 p. 450.
2 A paradigm influences the whole structure of scientific discussions, the types of analyses and models applied, and the types of management solutions suggested for problems. The dominant paradigm is questioned when too many anomalies occur, this means that a number of scientific results do not fit the paradigm. The old paradigm is questioned and with an increasing number of anomalies, new theories and methods are put forward. A change in a scientific paradigm means new models, different analytical approaches and altered management practices (Kuhn 1962).
2.1.1 Anthropological literature

As part of British colonialism, anthropological studies of the local societies were often carried out. In particular to achieve a better administration of the native people, the British authorities wanted information concerning the function and coherence of the local societies (Hastrup & Ovesen 1990). The theoretical framework applied for these studies was functionalism\(^3\). As will be appreciated functionalism remained a theoretical framework in anthropology for decades.

One of the first publications of major importance was Herskovits’ *The Cattle Complex in East Africa* from 1926 (Herskovits 1926). Although Herskovits had not been to East Africa when he wrote his article, he presented a coherent theory of the life in pastoral societies dealing with aspects of both the herding practices and the material culture. He argued that these societies’ attachment to cattle was so strong that it structured the basic values of the people. His idea was not to present an anthropological description of East Africa, instead he wanted to point out the importance of the local value system. However, the article has served as a reference for the discussion of the “irrational pastoralists” for decades. The implication of the article and the idea of the cattle complex will be discussed later.

In 1940, Evans-Pritchard published a study of the Nuer (Evans-Pritchard 1940). This was the first of a number of anthropological investigations using a structural\(^4\) functionalist framework. Evans-Pritchard did not accept the picture of irrational nomadic pastoralists, as he regarded their mobility as a sound response to the variable environment. Furthermore, the Nuer society was described as a self-contained community with little connection to the regional economy. Evans-Pritchard’s work was important to anthropological studies of nomadic pastoralism for decades. The Turkana, the Jie (Gulliver 1955), and the Karimojong (Dyson-Hudson 1966) were all pictured as adaptive societies using mobility and herd management as responses to environmental conditions. Also Stenning’s study of the Fulani in West Africa (Stenning 1959) uses ecology as the underlying explanation of pastoral mobility.

The work of Barth has also had great influence on the theoretical basis of anthropological literature on nomadic pastoralists. He continued the use of an ecological approach and emphasised the concept of niche\(^5\), defined as ‘the place of a group in the total environment, its relation to resources and competitors’ (Barth 1956 p.1079). In *Nomads of South Persia* (Barth 1986) a model was developed to explain how the pastoral society maintained an economic and social balance by losing both poor and rich members to the sedentary society. Later work includes field studies among pastoral Fulani of Africa (Barth 1988).

In the late 1960s the theoretical framework used for anthropological studies of nomadic pastoralism changed. It was considered (nature) deterministic to use the variable environment as an explanation of pastoral mobility, and the ideas of pastoral

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\(^3\) Functionalism was launched in anthropology by Malinowski (Hastrup & Ovesen 1990).

\(^4\) Structuralism as a theoretical framework entered anthropology after functionalism. However, structure is often combined with function; hence structuralism and functionalism are not mutually excluding categories (Hastrup & Ovesen 1990).

\(^5\) Refer to Hardesty (1972) for a discussion of the human ecological niche.
communities as self-contained were believed to be a result of the structural functionalist framework rather than a result of empirical observations (McCabe 1994). Thus, the functionalist paradigm in anthropology was abandoned and new explanations using politics and economics rather than ecology were applied. Examples of this can be seen in *Pastoralism in Africa* edited by Monod (1975) and *Pastoral Production and Society* (L’Equipe Ecologie 1979). In addition, there were attempts at using a structural Marxist approach, particularly in French anthropology (Morphy 1993); the French anthropologist Bonte (1981), for instance, provides a Marxist analysis of nomadic pastoral societies.

It is a matter of definition whether the change in anthropological theories should be termed a paradigm shift. Nevertheless, no new set of theories became dominant. Throughout the 1970s and 1980s agreement concerning the causes of pastoral mobility was lacking in anthropological literature. In fact, one could argue that instead of a paradigm shift there has been a refinement of the idea of nomadic pastoral societies as being adaptive, from the first notions of adaptation to the environment to the addition of more and more factors, for example politics, to the adaptive model. The adaptive model will be further elaborated in the next section.

The anthropologist Ida Nicolaisen explains that anthropologists have always regarded indigenous societies as being rational and possessing an internal harmony. The shift from structural functionalism did not change the idea of rational societies, but they are no longer perceived as being in harmony (Nicolaisen 1996b). However, rationality should be perceived from within the society, according to the specific beliefs and values of the society. Political and economic studies tended to interpret rationality from political and economic practices, rather than from the systems of thought and the assumptions, beliefs, and aims that underlie the nomadic pastoral strategies (Galaty 1989).

Recently, there has been a (paradigm) shift within anthropology, but this concerns the anthropological method. It affects the relationship between the researcher and the informant, how the researcher influences the object studied, and thus the outcome of the research. It is yet not possible to determine how this influences the studies of nomadic pastoral societies. Furthermore, the anthropological research method is being revised because field studies have proven to be very time-dependent, meaning that studies of the same society in two different years often yield quite different results (Nicolaisen 1996b).

**2.1.2 Ecological and economic literature**

In the 1970s the scope of studies of nomadic pastoralists changed. The drought years in the beginning of the decade caused scholars other than anthropologists to be aware of the nomadic pastoral population. With the growing awareness of environmental problems in the developed world this view was transferred to the drought-plagued African pastoralists. Range ecologists, economists, and other newcomers to the study of nomadic pastoralists added new dimensions to the discussion.

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6 An exception being the Marxists who emphasises differences rather than harmony.

7 Refer to appendix 2 for a definition of strategy.
Much of the literature concerning nomadic pastoralism focused on the so-called failure of the pastoral economy; the impact of drought seemed devastating and the consequences of development projects were not positive (Scoones 1995). Desertification and degradation became commonplace terms in the discussion of nomadic pastoralism, and the image of irrational pastoralists was often maintained. Typical examples of this are Brown (1971), Lamprey (1983) and Picardi (1974). Brown accuses pastoral milk production of being irrational; by means of numerical analysis he proves meat production more suitable to the environmental conditions. Furthermore, pastoral production is claimed to cause overstocking, overgrazing and environmental destruction.

Lamprey, on the other hand, considers pastoralists to be rational from the perspective of their own survival, but he still regards pastoralists as being backward and conservative as well as causing overgrazing and degradation.

The tragedy of the commons problem is the objective of Picardi’s study. By means of systems analysis he proves that there is no strong feedback from range condition to the behaviour of the pastoralists. Hence, they do not manage their resources for the long-term future. Furthermore, he describes pre-colonial pastoral life as a story of drought, disease, warfare and constant, human caused desertification.

In the late 1980s and the early 1990s the picture changed: the idea of nomadic pastoralism as maladaptive was questioned and the environmental problems were seen in a new light. Some of the first researchers who drew attention to the need for a paradigm shift were Ellis and Swift in 1988 (Ellis & Swift 1988). Their article ‘Stability of African pastoral ecosystems: Alternate paradigms and implications for development’ pointed out that the “dominant paradigm” appeared not to correspond to the reality. Their background and thus starting point is the function of the ecosystem:

“African pastoral systems have been studied with the assumptions that these ecosystems are potentially stable (equilibrial) systems which become destabilized by overstocking and overgrazing.”

(Ellis & Swift 1988 p.450)

Before elaborating further on the new paradigm it seems appropriate to discuss the old paradigm. This was linked to systems ecology and the ideas of systems analysis (Zimmerer 1994). In broad terms it depended on three sets of actors and arguments (Warren 1995):

- range ecologists who believed in the model of vegetation succession and ecological equilibrium
- economists who believed in the tragedy of the commons
- administrators who regarded pastoralists as being backward and destructive

The model of succession and ecological equilibrium

The conventional approach, which was the basis for monitoring range conditions in Australia and USA, build on the Clementian model of vegetation succession. This model depicts vegetation changes as deterministic series of vegetation types ending with a vegetation climax community. The climax

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8 ‘Dominant paradigm’ is Ellis and Swift’s (1988) term for what is called the old paradigm today. The expression ‘mainstream view’ is also used for the old paradigm (Ellis et al. 1993).

9 Refer to appendix 2 for discussions of range management, vegetation succession and equilibrium environments.
community may fluctuate in composition, but it will remain relatively unchanged over long periods of time (Querioz 1993). According to the model, grazing pressure produces vegetation changes in a direction opposite to the succession tendency. Thus, a vegetation equilibrium can be produced by setting the stocking rate at a level equal and opposite to the natural vegetation succession tendency. Implicit in the model is the idea of ecological equilibrium or equilibrial ecosystems; from an equilibrial grazing ecosystem a sustainable production of livestock can be expected (Westoby et al. 1989).

Other terms follow the ideas of vegetation succession and ecological equilibrium. These are sustainability and carrying capacity, and they will briefly be mentioned here. It should be noted that sustainability is used within both the old and the new paradigm, but the meaning of the term is not the same in the two cases.

**Sustainability** describes a condition where a system and the environment in which it exists are at equilibrium, or in other words where the system does not cause injury to the environment so production does not decrease (Bartels et al. 1993). The importance of sustainability is not as much sustainability *per se* as the use of the concept as a kind of comparative measure. For instance, **carrying capacity** is linked to the sustainability concept. Carrying capacity can be defined as the maximum stocking rate of herbivores that can be supported on a sustainable basis (FAO 1988 in Tothill & de Leeuwe 1990). There are different measures of carrying capacity; the two major approaches are the plant-oriented and the animal-oriented. The first assesses the feed resources in terms of a proper use factor, the latter includes the seasonal variation in herbage quality. Thus, animal-oriented types of carrying capacity measurements tend to be lower than the plant-oriented ones (Tothill & de Leeuwe 1990).

The tragedy of the commons

The conventional theory of the commons is usually said to have its origin in the mid-1950s. It was Hardin, however, who in 1968 launched the idea of the **tragedy of the commons** by the article of the same name in *Science* (Hardin 1968). Although the article focused on overpopulation, Hardin became known for his ideas of over-exploitation of common resources (Feeny et al. 1990). His article was based on a supposition using herders as the example. The herder, he claimed, was likely to extend his herd until the point of overgrazing, because the profit of extra animals went to the herder, but the costs of over-exploitation were held in common and thus, only a fraction was paid by the herder. Hardin concluded therefore that freedom in the commons would lead to common ruin. When degradation was considered an unavoidable consequence of common-property, privatisation appeared to be the solution. Thus, change of tenure regimes was often part of development projects (McCabe 1990).

The conservative and destructive pastoralist

The most common ‘proof’ of the conservatism of nomadic pastoralists is their attachment to cattle, also called the **cattle complex**. This term was first used by

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10 Refer to appendix 2 for a definition of the commons.
Herskovits in 1926. The attachment to cattle (or in some cases to camels) seen among most pastoralists is unquestionable; however, the phrase has been widely misused and is now commonly used to express an “irrational” attachment to cattle. Barfield states:

“...the prestige associated with cattle ownership appeared to overshadow their economic value to the point of irrationality.”

(Barfield 1993 p.20)

The image of the destructive pastoralist is linked to the idea of degradation. The word degradation is, as other environmental words, involved with normative connotations (Blaikie 1995). Nomadic pastoralists were accused of destroying the land, because it appeared that livestock grazing of rangelands altered the vegetation composition and changed the land’s ability to sustain the livestock and thus human population (Lamprey & Yussuf 1991 ).

The old paradigm builds upon these concepts, some of which are still widely used despite the critique. These are carrying capacity, sustainability, the tragedy of the commons and to some extent the cattle complex.

It is clear that the views of ecologists, economists and administrators were closely related. Although range ecologists were the first to realise the inadequacy of the old paradigm, the paradigm shift was also closely linked to the failure of development projects targeted for nomadic pastoralists. Years of development programs failed to relieve the problems, in some cases they even seemed to get worse (Farah 1996). The lack of success was so huge that both some of the funding agencies and the research organisations gave up and invested their time and money elsewhere (Ellis & Swift 1988). There simply seemed to be a universal failure of the development interventions, which is to be expected if invalid paradigms underlie the ideas of development, as pointed out by Ellis and Swift.

In order to explain what has happened it is useful to return to the set of actors and arguments on which the old paradigm depended. It is appreciated that the actors are the same, but the arguments have changed:

The model of succession and ecological equilibrium

Some of the cornerstones for the shift in ecological thinking were made in the decades before the paradigm shift. The Clementsian model of vegetation succession (the old dryland ecosystem model) was questioned by Lewis in 1969 (Warren 1995), and Noy-Meir suggested in 1975 that ecological equilibrium only was occasional in arid and semi-arid environments (Noy-Meir 1975). However, a new model based on these findings was not proposed until the late 1980s. This new dryland ecosystem model is termed the instability-but-persistence model (Warren 1995) or the state-and-transition model11 (Westoby et al. 1989). It describes arid and semi-arid ecosystems as being non-

11 Both terms are used in the literature, but one could argue that the instability-but-persistence model is more theoretical, aiming at providing a theoretical framework for future analysis, and the state-and-transition is more operational, aiming at providing new tools for the investigations of rangelands. Ellis (1995) states that the state-and-transition model focuses on the idea of several stable states and emphasises how herbivores and climate events combine to drive an ecosystem from state to state.
equilibrial (changing from one state\textsuperscript{12} to an other) due to strong external controls i.e. droughts, fires, insect attacks and, in some cases, management (Ellis & Swift 1988). Within these areas of highly variable resources in both a spatial and temporal perspective, there are patches of good conditions that allow the survival of species (Warren 1995).

**Sustainability** was surprisingly little analysed and used in many different ways within the old paradigm (Warren 1995). A system can for instance be described in terms of both ecological sustainability, economic sustainability and social sustainability. The ecological sustainability is often linked to the concept of degradation in the way that sustainability is believed to be the threshold beyond which degradation will occur. However, researchers have pointed out that degradation is more frequently on a sliding, continuous scale (e.g. Abel & Blaikie 1990). Within the new paradigm, (production) systems that account for the fluctuating environment can be described as sustainable. This means flexible strategies are sustained (Thébaud et al. 1995), which in case of opportunistic stocking means that fast destocking possibilities are ensured (Perrier 1995).

**Carrying capacity** has been widely criticised (see Tothill & de Leeuwe 1990, Bartels et al. 1993). The major implication of carrying capacity is that it builds upon an implicit idea of ecological equilibrium and homogeneity (Zimmerer 1994). Another point of criticism is that “balances” depend on development/change rates of different speed. Also, the concept does not allow a non-linear relation between animals per hectare and weight gain per hectare. This means there might be a stocking rate above and below which the weight gain per hectare is lower (Warren 1995). The concept is no longer considered an objective measure as the carrying capacity varies with the management objective. Behnke & Scoones state:

“...there is no single biologically optimal carrying capacity which can be defined independently of the different management objectives associated with different forms of animal exploitation.”

(Behnke & Scoones 1993 p.6)

Moreover, the concept has been developed for fenced pastures and is estimated per unit area; hence, it does not adjust to the flexibility of nomadic movements. It has therefore not proven useful to studies of nomadic pastoralists in Africa (Bartels et al. 1993).

The tragedy of the commons

The appreciation of disequilibrial nature of dryland ecosystems was followed by the awareness of mobility as a sound response to the environment. Mobility is constrained by borders, national or private, and full mobility necessitates some kind of access to pastures. Open access to resources was claimed to induce the **tragedy of the commons** problem. However, most nomadic pastoralists do not have open access systems, instead access to resources is regulated by social institutions. Moreover, a number of articles have examined the land use of

\textsuperscript{12}As Westoby et al. (1989) mention, a state is an abstraction encompassing a certain amount of variation in space and time.
nomadic pastoralists and found no tragedy of the commons (e.g. Livingstone 1986, Hjort 1990b, McCabe 1990, Baxter 1991).

The conservative and destructive pastoralist

The so-called **conservatism** of pastoralists builds upon their resistance towards development initiatives and on the cattle complex. In the light of the paradigm shift, pastoral resistance is not merely unwillingness, but a rational response towards irrational development initiatives (Warren 1996). As far as the cattle complex is concerned, Nicolaisen argues that the term is valid as long as it is used to describe the imagination of (east African) pastoralists (Nicolaisen 1996b). The problem is the use of cattle complex to cover an economically irrational attachment to cattle. In this case the term changes from dealing with people’s concepts to dealing with their way of doing things (Nicolaisen 1996b).

The notion of **destructive pastoralists** was based on the assumption that they were causing land degradation. The concept of land degradation is highly questioned within the context of the new paradigm. There is an emerging consensus among range ecologists and other people engaged in the range debate that the term degradation should be reserved for irreversible changes in the ecosystem. This means range degradation should mean management-induced changes causing permanent damage to the ecosystem’s processes and to its ability to regenerate itself. According to Queinoz (1993), land degradation can be regarded from two different viewpoints: the ability of the land to produce a commodity, or the ability of the land to run the basic processes that permit the ecosystem to regenerate itself. Hence, the term land degradation is meaningless without an explanation of the context.

A consequence of the new paradigm is the changed conception of **time**. This is not mentioned explicitly in most of the ecological literature but it is of major importance, especially when the new paradigm is sought integrated in approaches applied by anthropologists, geographers and archaeologists. Zimmerer (1994) points out that the old paradigm used a **static time** concept (or a time-independent approach) due to the interpretation of equilibrial conditions, cyclical succession and most of all due to systems ecology. In the new paradigm a **dynamic time** concept is applied: in other words the emphasis is on historical time. This is because of the irregular periodicity of the environment.

An example of the implication of the old paradigm can be found in Botswana. A study was carried out to evaluate if the rangelands were being degraded (Queinoz 1993). One of the reasons for this was that the idea of range degradation was so widespread that the government, under the pretext of stopping range degradation, made legislation to transfer the control over land from communities to individuals. Obviously, this had high social costs and would be meaningless if the presumed degradation did not occur at all. Implicit in this discussion was the idea of the tragedy of the commons - the rangelands were being degraded and this could be stopped by changing the ownership from communal to private. One of the results of this study was that the combination of drought and heavy grazing appeared to cause drastic alteration of the vegetation composition over a relatively short time. Another result was that herding was concluded
to be a better means of livestock nutrient transfer than ranching\(^\text{13}\) because ranch cattle tend to linger in the vicinity of the watering point. This means that a substantial part of the manure is dropped in the sacrificed zone where it is not of great use. The management practices of nomadic pastoralists were evaluated as possible causes of change in the vegetation composition. It was not determined whether degradation was taking place, but nomadic pastoralism was concluded to be a better means of production than ranching. Hence, there was no reason to change the tenure systems even if degradation was occurring (Queinoz 1993). The tragedy of the commons idea was not supported by the study, although the idea was implicit in the government’s starting point. Thus, the study ended in the lines of the new paradigm.

Finally, it should be noted that the paradigm shift happened gradually. Konczacki’s *The Economics of Pastoralism* (1978) was based on the old paradigm. Nevertheless, the study ended up considering pastoralism the most appropriate livelihood in African rangelands. There are many examples of scientists relying partly on the old paradigm and partly on the new (e.g. Tothill & de Leeuw 1990). Moreover, there have been anthropologists who believed in the rationality of nomadic pastoralists and tried to make this fit the ideas of the old paradigm. An example of this is Widstrand, who argued that nomadic pastoralists were rational (Widstrand 1975). However, he still supported the concept of the tragedy of the commons, saying that due to the communal ownership of land, the individual cannot do anything but try to increase their herd size, even if this will lead to an ecological disaster.

### 2.1.3 Literature critique

The study of nomadic pastoral utilisation systems is an interdisciplinary endeavour. The present study draws on information from anthropology, range ecology, archaeology, geography, and economy. However, it is impossible to stay-up-to date with developments within each discipline. Furthermore, therefore complexities have to be simplified and theories might not be fully understood, so wrong explications may have been chosen. Hence, considering the shifts in theories and approaches it appears that integrated studies dealing with both anthropological, ecological and economic aspects of the nomadic pastoral utilisation system would be preferable. These have been made in Turkana (McCabe 1987, Ellis et al. 1993), and provide very valuable information about the nomadic pastoral way of life. Yet, books claiming to provide an “integrated approach” often turn out to be a mere collection of articles with different approaches integrated in the same book (for instance Irons & Dyson-Hudson 1972, Galaty & Johnson 1990, Fratkin et al. 1994).

Hence, it is problematic that the analysis is based on papers with quite different underlying concepts and thus different ideas of sound management, rationality, environmental costs, etc. As the literature used here mainly consists of anthropological, ecological, geographical and to some extent archaeological accounts, it is important that the results from one field are compatible with results from the other fields. The major

\(^{13}\) By ranching is understood sedentary livestock rearing, where the grazing areas are fenced; fodder can be used in times of drought. Each paddock has a watering point and the area of the paddock is determined on the basis of the maximum walking distance from the watering point. Furthermore, Galaty (1989) mentions that ranching is a commercial activity, thus the production and the market are linked through an assessment of the commercial value.
problem in this context is how the paradigm shift within ecology/economy has been perceived in anthropology and geography.

As mentioned in the quote in the beginning of the chapter, our view of the world influences the way we deal with systems. It is therefore important to keep in mind that the ideas of ecology and biology have mainly been developed in a Western intellectual context. Hence, the old paradigm has a solid background in our culture and ideas. The acceptance of the new paradigm can therefore not be expected to be completely integrated in our thoughts and assumptions yet, especially within disciplines that are not concerned with nature per se, even if the author explicitly supports the new paradigm.

Elements of Western thinking of the past 2000 years can be identified in the old paradigm. There are carry-overs from the Christian belief that each species was created to fill its own niche and exist in harmony with all others. Other concepts reflect the Enlightenment ideal of progress and linear thinking. These ideas are also seen in Malthus’ theories of population growth and food production (Ellis et al. 1993). Nineteenth-century Romanticism has also influenced ecology, especially ecological anthropology, with the notion of nature as being undisturbed and man as the disturbing (manipulating) factor. In this light, traditional societies were perceived as the most natural societies because they were the least disturbed. Finally, Darwin’s evolutionary theory is based on concepts of adaptation and linear, gradual development (Ellis et al. 1993).

An obstacle caused by the change to the new paradigm is the decline of predictive capacity and analytical certainty which are characteristic of systems ecology (Zimmerer 1994). This might cause hesitation and reluctance among anthropologists, geographers and archaeologists to adopt the new paradigm. Moreover, the new paradigm might appear to justify human-induced environmental degradation, and can therefore seem intuitively wrong to geographers and others concerned with environmental conservation (Zimmerer 1994). As a consequence, either the whole concept of the new paradigm is rejected, or only the bits that fit the researcher’s idea of environmental degradation are retained. Examples of this can be found in Pastoral Development Network Papers from ODI (Able 1990, Adams 1990, Cooke 1990, Dougill & Cox 1995).

However, the new paradigm is expected to be integrated in human geography without too much reluctance. This is because a full understanding of the environment is crucial to human geography for analysing human-environment relations, and there are similar orientations between human geography and the new paradigm. These are the importance of time (history), spatial scale and subjectivity (Zimmerer 1994). As far as archaeologists and anthropologists are concerned, these approaches imply a “less sophisticated” understanding of nature and therefore a tendency towards cultural determinism (Blumler 1996). Thus, it is expected that the old paradigm still underlies much of anthropological and archaeological literature. As mentioned by Scoones (1995) the effective translation of languages between disciplines is a significant hurdle.

2.2 Theoretical framework
The purpose of this section is to establish the theoretical framework of the thesis. First, important elements of man’s adaptation to environment are presented; then, the different ecological frameworks are discussed especially in terms of the implication for anthropological and human geographical analysis. Finally, the approach of the thesis is described.

2.2.1 Human adaptation

Adaptation can be defined as man’s adjustment for survival in an environment (Morphy 1993). The adaptation of man to the environment has many names; Bennett (1976) uses human adaptation, Birket-Smith (1964) geographical adaptation, and Harrison (1993) subdivides human adaptation into genetic adaptation, physiological adaptation, behavioural adaptation and cultural adaptation. Whichever term one prefers it is important to keep in mind that each individual culture makes its own special demands on the environment in which it exists, just as the environment is one of the elements defining the potentials of each individual culture. In the present case, the term human adaptation is preferred, as this emphasises who or what is adapting, but it is only the behavioural and cultural components of human adaptation that are considered of relevance for the present study.

According to Morphy (1993) adaptation can be viewed from both a short-term and a long-term perspective. The short term refers to the ways in which a population modifies its behaviour to stochastic environmental changes. Behavioural adaptation is thus considered a short-term adaptation. Cultural adaptation refers to a population’s adaptation to predictable environmental changes, for instance seasonal changes; hence it includes the long-term perspective. Also, behavioural adaptations are often linked to individuals, whereas cultural adaptation is linked to a group, a society. New behavioural adaptation can be learned by the individual on a trial-and-error basis; by being passed on to others, the adaptation can become a cultural adaptation through the cultural transmission (Dunbar 1993).

Birket-Smith (1964) explains that all cultures adapt themselves to the environmental conditions under which they exist, even though not all cultures exhibit the same degree of adaptation. In desert environments, for instance, a high degree of adaptation is necessary if human populations are to exist (Birket-Smith 1964). Morphy (1993) claims that in harsh environments, such as deserts, the constraints imposed by the environment are relatively more deterministic in their effect than in temperate environments. This means that certain utilisation systems such as nomadic pastoralism can be expected to display a greater deal of parallel development in desert regions than elsewhere (Morphy 1993). However, there is no particular culture form that corresponds with a particular geographical environment.

Human adaptation is not straightforward. Adaptation to environmental conditions is necessary, but the more specialised a culture is, the more limited are its possibilities. Hence, the less specialised a culture is, the better are its chances under changing environmental conditions (Birket-Smith 1964). In addition, the better the behavioural

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14 Other important elements are technology, labour, and money.
adaptation (the short term adaptation) of a more or less specialised culture is, the better are its chances under changing conditions.

The concept of adaptation has been widely ignored in the structural functionalist anthropology of Britain, an exception being Evans-Pritchard’s *The Nuer* (1940). Within ecological anthropology and especially studies of nomadic pastoral societies, the idea of adaptation of culture to the environment is widespread (Morphy 1993) (for a thorough discussion of the adaptation concept in anthropology refer to Bennett 1976). For instance, adaptation is used as the explanation of Maasai cattle colour preference (Dunbar 1993). However, this does not mean that culture is only an adaptive system. In the present case adaptation is regarded as one of the factors influencing the way in which a cultural system develops over time. Adaptation is therefore an important factor to consider when studying the development of nomadic pastoral societies.

### 2.2.2 Ecological frameworks

The interaction between man and the environment, or culture and nature has been investigated for many years. Various approaches have been applied in anthropology and human geography; these will briefly be reviewed.

According to Bennett (1976) there have been five successive theoretical approaches to nature’s impact on culture. Four of the five are recognised by Hastrup and Ovesen (1990). A short presentation of the approaches based on the two sources (Bennett 1976, Hastrup & Ovesen 1990) are presented in the following.

1. **Deterministic anthropogeography:** Nature pre-exists culture and culture is thus determined by nature, especially by climate. Linear causal model.
2. **Possibilism:** Culture is the basis of behaviour. Nature plays a more moderate role as a constraint on the development of culture. Linear causal model.
3. **Stewardian cultural ecology:** There is a stronger focus on culture. Man is perceived as a bearer of culture who imposes the super-organic factor of culture upon nature. However, nature still has strength as a causal agent. Feedback model.
4. **Cultural ecosystemicism:** The analytical strength is the application of the ecosystem idea. Culture and environment are perceived as an interconnected socio-natural system, where none of the elements are deterministic. Feedback model.
5. **Adaptive dynamics:** This is similar to the ecosystemicism, but the focus is on the behaviour and actions of man. More feedbacks are included. However, it is not a feedback model, but an adaptive model - it sees the outcome as a result of decisions and choices made by man.

The latter three approaches are called ecological approaches in the following discussion. The reason is that various approaches termed ecological are based on elements of these three. The first two approaches are not considered important today and will therefore not be further elaborated. There is a link between these five ecological approaches, mainly applied by anthropologists and human geographers, and the paradigms of ecologists and economists that were mentioned above. An example of the similarity of ideas between the old paradigm and one of the ecological approaches is that both the
Stewardian cultural ecology and the Clementsian succession model build upon the concepts of progression, linearity and graduality. An example of similarity between the new paradigm and one of the ecological approaches is that the adaptive dynamics model has an emphasis on time and on change (Bennett 1976). This agrees with the new paradigm’s notion of historical time, as opposed to the notion of cyclical time of the old paradigm.

The five approaches all build on each other, trying to include an increasing number of variables. Hence, the change of approaches can not be termed a paradigm shift, although different causal models are applied. However, these models are implicit or explicit frameworks of much of the anthropological and human geographical literature on nomadic pastoral societies. It should be emphasised that these are theoretical models applied by scientists. Hence, they do not necessarily correspond with the underlying assumptions about humans and the environment that can be discovered in society in general. It is considered beyond the scope of the thesis to discuss the latter, although it is acknowledged that there is a mutual influence between the scientific models of man and the environment and society’s underlying assumption about the same.

As mentioned, various ecological approaches have been developed. It is not always obvious what the difference between, for instance, a human ecological approach, a cultural ecological approach, and a political ecological approach is.

The use of ecology in anthropology is partly due to Julian Steward who in the 1950s introduced the concept of cultural ecology (see for instance Steward 1972). Steward’s analysis goes beyond the approaches of anthropogeography and possibilism by selecting only those features of the culture and the environment which are interrelated (Netting 1965). Steward points out the importance of seeing man as a bearer of culture when applying ecology, which originally only was a tool for biological systems, to human systems. Cultural ecology is mainly a tool for analysing the environmental adaptations, to show how new cultural patterns arise. Steward states that cultural ecology does not seek to derive general principles, and applies the concept of cultural core to describe ‘the diagnostic features of any given era’ (Steward 1955 p.93). The method applied for cultural ecology consists of an analysis of the interaction between the environment and the technology used to exploit it, an analysis of the behaviour pattern involved in the exploitation, and finally an assessment of the extent to which the behaviour pattern affects other aspects of the culture (Steward 1972).

Although Steward’s cultural ecology has been criticised (see for instance Zimmerer 1994), it is obvious that it has served as inspiration for the further development of ecological approaches.

The anthropologist Bennett (1976) uses the terms human ecology and cultural ecology (more or less) at random. He states:

“Human or cultural ecology is a study of how adaptive systems influence the physical environment and the human environment as well.”
(Bennett 1976 p.95)

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15 Refer to Colby (1991) for a thorough account of the changing environmental paradigms.
16 For the use of human ecology in geography and other disciplines refer to Christiansen (1967).
He describes a version of human/cultural ecology called adaptive dynamics or human adaptation (Bennett 1976). It is a systems-oriented approach in which interactions within the society or culture are given the same attention as interactions between culture and environment. The difference between Bennett’s human ecology and conventional biological ecology is that humans are perceived as something special and not just another species. This is his reason for separating culture from the environment. Bennett believes that what makes humans special is that they have an adaptive behaviour which means an ability to adapt to new situations and environment very fast without genetic changes. Moreover, man has the ability to think and make calculations, to behave according to an aim, and man can also choose and be aware of the consequences. Hence this bias in the evolutionary status has given man a superior or dominating status compared to other species.

Another version of human ecology is provided by the geographer Carlstein (Carlstein 1982). He applies a version of time-geography and moves the focus from the biological interaction. The main emphasis in Carlstein’s human ecology is on interactions and the use of the resources of time and space. According to Carlstein, the core of human ecology is the interaction between resources and localisation. Hence, the time-geographical approach is important as this acknowledges time and space as important resources, which are often neglected in other versions of human ecology. The focus on time and space has proven very useful in studies of nomadic pastoralist systems (Adriansen et al. 1993), as these are highly variable especially in space, and exist in environments that are highly variable in both time and space.

Political ecology builds on the critique of both anthropological and geographical studies from the 1960s and 1970s. These studies were said to regard local societies as closed systems independent of a political and economic context (Lund & Engberg-Pedersen 1994). The British geographer Piers Blaikie is a central person in the discussion and development of political ecology. He is especially interested in developing countries and claims that the conventional farming systems approach is no longer sufficient (Blaikie 1995). Thus, farming systems should be considered as integrated in a larger political and economic context. Farmers, he explains, have other non-farming activities that might determine their input of labour and capital in their agricultural system. Hence, explanations of the structure of a local society are found within the analysis of national and international political economy (Lund & Engberg-Pedersen 1994). Blaikie also discusses more general issues, and two important points are to be mentioned here. The first is that the individual and the society have different objectives and each of them will prove to be rational, although their goals might be opposites. This is what he calls plural truths and interests (Blaikie 1995). The second lesson to be learned from Blaikie is that the world can never be perceived as it is, because one will always view it through an individual as well as a socially shaped optic. In other words, our view of the environment is socially constructed because what we see and interpret is based on our own experiences and cultural background.

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17 Time-geography is a theoretical approach founded by Hägerstrand and other researchers at the University of Lund (Parkes & Thrift 1980).
2.2.3 Thesis approach

The approach applied for this thesis is a combination of Bennett’s cultural ecology (1976) and elements of Blaikie’s political ecology (1995). It is also inspired by Carlstein’s ideas of time and space as key resources (1982). However, most of all, the thesis is based on the new paradigm within the ecological and economic disciplines.

The adaptive dynamics approach advocated by Bennett emphasises the importance of human adaptation, which also is of importance for the present study. The notion of cultural adaptations as long term responses implies the need for an historical perspective on the study of the development of nomadic pastoral systems.

Hence, the reason for choosing an ecological approach for the study of nomadic pastoral utilisation systems is that these are characterised by close interactions between culture and nature. Considering the paradigm shift it appears important to take the changed views into consideration; it is believed that an ecological framework focusing on the historical development is the best tool.

2.3 Summary

There has been a paradigm shift within ecological and economic studies of nomadic pastoral societies and their environments. Within the new paradigm, arid and semi-arid ecosystems are perceived as being in permanent disequilibrium, but persistent on broad temporal and spatial scales, and many of the pastoral strategies are seen as carefully adapted to this.

All cultures, and especially cultures existing in harsh environments, have traits of adaptation to the nature in which they exist. Short-term, individual adaptation to changing conditions is called behavioural adaptation, whereas cultural adaptation refers to a group’s long-term adjustments to the environment.

The principle of the ecological and historical approach described in this chapter attempts to provide an alternative way of looking at the adaptation of the nomadic pastoral utilisation system in Africa. While the concepts may be well-known, they require one to be aware of considerable background information, to recognise the adaptive strategies of the population, and to identify the physical and social parameters that make systems, which may have matured over millennia, work.
Chapter 3

CHARACTERISTICS OF THE NOMADIC PASTORAL UTILISATION SYSTEM AND ITS NATURAL ENVIRONMENT

Heidi is not the story of a Swiss nomad girl
though she herded cows and goats each summer

In this chapter a short introduction to nomadic pastoral utilisation systems and arid and semi-arid areas, also called rangelands, is given. The area of interest is Africa, but many of the characteristics are also applicable to other areas. It might seem unnecessary to present an introduction like this; however, given the fairly broad approach of this study, it is considered appropriate to provide some background before starting the analysis. This chapter will therefore consist of a description of the main characteristics of nomadic pastoral utilisation systems and the environments in which these exist.

The chapter starts with information concerning the number of nomadic pastoralists and the size of the arid and semi-arid areas. The description of the natural environment follows. This should not be interpreted as an implicit nature deterministic approach; it is only done because it seems relevant to provide information on the natural resources before describing the utilisation of the natural resources. Emphasis is given to characteristics relevant for nomadic pastoral utilisation, i.e. conditions for vegetation growth, etc. Moreover, the dynamics of rangelands are analysed with respect to the concepts of the new paradigm. Then, different classifications of nomadic pastoralists are mentioned, and characteristics of the nomadic pastoral utilisation system are outlined. Finally, the motive for choosing the three main themes mentioned in chapter 1 is explained. The three main themes - availability and use of range and water, tenure systems, and exchange or market relations - are chosen on the basis of the characteristics of the nomadic pastoral system.

3.1 Nomadic pastoralists in arid and semi-arid areas

About two-thirds of the African continent comprises arid or semi-arid areas, whereas the figure for the world in general is one-third. The majority of rural African drylands are inhabited by livestock keepers, who are either pastoralists or farmers combining rainfed agriculture with pastoralism (Sandford 1983).

Below three estimates of the size of the pastoral population are provided. It is important to keep in mind that some of these estimates are more than 20 years old and that the number of pastoral people today is probably not the same. Moreover, the numbers given for the pastoral population might not always be identical with the nomadic pastoral population (Sandford 1976b).

<table>
<thead>
<tr>
<th>Estimate</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le Houérou</td>
<td>1979</td>
</tr>
<tr>
<td>Widstrand</td>
<td>1975</td>
</tr>
<tr>
<td>Sandford</td>
<td>1976b</td>
</tr>
</tbody>
</table>

1 Barfield 1993 p.5.
2 Refer to appendix 1 for a map showing the arid and semi-arid areas in Africa.
Table 3.1 Estimates of the pastoral population in different parts of Africa.

<table>
<thead>
<tr>
<th>Region</th>
<th>Population</th>
<th>10-15 million</th>
<th>6-7 million</th>
<th>9.3 million</th>
</tr>
</thead>
<tbody>
<tr>
<td>North &amp; West Africa</td>
<td>4 mill</td>
<td>10-15 mill</td>
<td>8 mill</td>
<td></td>
</tr>
<tr>
<td>South &amp; East Africa</td>
<td>16 mill</td>
<td>6-7 mill</td>
<td>9.3 mill</td>
<td></td>
</tr>
<tr>
<td>Africa in total</td>
<td>20 mill</td>
<td>16-22 mill</td>
<td>17.3 mill</td>
<td></td>
</tr>
</tbody>
</table>

Even though the total number of pastoralists in Africa is of the same magnitude, the estimates for the regions vary. Hence, approximately 20 million pastoralists inhabit the African dryland, which is more than 50% of the total number of pastoralists in the world. Nevertheless, in most African countries only 10% of the population are pastoralists. In West Africa the pastoral populations constitute the largest proportion of the total population, and in Africa north of the Sahara pastoralists compose the smallest proportion of the population (Sandford 1976b).

It is appreciated that pastoralists, though small in number, occupy a large area. With increasing aridity population density decreases, and a high degree of mobility provides the answer to low and highly variable rainfall (Le Houérou 1979).

3.2 Characteristics of arid and semi-arid areas

The characteristics of arid and semi-arid areas are discussed below with respect to the new paradigm, as mentioned. However, first it is important to determined how applicable the new paradigm is: this is the issue of the first section. Characteristics of the rangelands follow: in this context it is primary production that is of relevance. Therefore, the main issues are variable precipitation and the importance of this for vegetation growth, and finally the impact of fire and soil erosion is mentioned. Foremost, it is important to define arid and semi-arid areas. Arid and semi-arid areas can either be defined in terms of the relationship between rainfall and potential evaporation, or simply in terms of rainfall. One definition is that areas with an annual rainfall of less than 200 mm are arid and areas with a rainfall of 200-600 mm are semi-arid (UNCOD 1977 in Sandford 1983). In West Africa this definition of the semi-arid zone coincides with the most common definition of the Sahelian zone (Agnew 1990). However, in West Africa the semi-arid zone is sometimes defined as reaching the 800 mm isohyet, while in North Africa the semi-arid zone only extents to the 400 mm isohyet (Sandford 1983).

3.2.1 The applicability of the new paradigm

As mentioned in chapter 2, our understanding of nomadic pastoral ecosystems has changed within the last decade. However, it is yet unknown how applicable the new concepts of disequilibrium are. There appears to be consensus on the point that the new paradigm is most realistic when applied to arid and semi-arid areas with erratic rainfall (Ellis et al. 1993, Stafford Smith & Pickup 1993). Arid and semi-arid ecosystems are more unpredictable than wet ones, because rainfall variability is inversely correlated with total precipitation. The lower the annual rainfall, the greater the coefficient of

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3 It should be kept in mind that these numbers are rough estimates and will vary according to the definition of pastoralism, etc.

4 Refer to Heathcote 1983 for a discussion of the implications of different definitions.
rainfall variation (Ellis 1995). When the coefficient of variation (CV) of annual precipitation exceeds 30%, the long-term performance of ecosystems is better characterised in terms of variability than by measures of mean values (Ellis et al. 1993). Other investigations show that strong feedback between herbivores and vegetation will develop when the CV is below 20% (Ellis 1995). An attempt at separating the areas dominated by disequilibrium from those dominated by equilibrium has determined 600 mm annual precipitation to be the point of separation in Africa. Areas receiving less than 600 mm are expected to have a CV above 33% and are hence dominated by disequilibrium dynamics. It should be mentioned, though, that areas receiving more rainfall can also have a CV above 33%, depending on the latitude (rainfall variation is negatively correlated with latitude), and the influence from El Niño-Southern Oscillation (Ellis 1995). This means that the areas defined as arid and semi-arid above are dominated by disequilibrium dynamics. Hence, the new paradigm is supposed to be applicable to the areas mentioned in this thesis.

3.2.2 Precipitation

The African rangelands encompass a number of rainfall regimes from mono-modal in the Sahel (Le Houérou 1989) to bi-modal in East Africa, but precipitation is always low, variable and unpredictable (Perry 1981). The high spatial and temporal variability is often considered more problematic than the low precipitation, although these are interrelated. Unpredictability of rainfall is as important as variability as it reduces the number of management options available (Stafford Smith & Pickup 1993). The implication of the high variability can be exemplified by taking a general look at the Sahel. Here the prevailing winds bring rain to the edge of the Sahara from May to August, which is the wet season. During the nine month dry season only traces of rain occurs. Most of the rain falls in the South tapering off to the North. Hence, there is some predictability in the timing and pattern of the precipitation when looking at a large scale. Yet, within a region one area may receive well above average rainfall, while an adjacent area receives nothing. Another area may receive rainfall below normal, but scattered over a four-month period, which gives vegetation the opportunity to make maximum use of the precipitation, while in a neighbouring area there may be above average rain, but it may fall within a two-week period, so much of its usability is lost (Schusky 1989).

Precipitation is an important indicator of the moisture available for plant growth. However, it is not only precipitation that determines plant production; evaporation is another important factor. In estimates of rangeland productivity available water is often used instead of precipitation; available water is determined by climate (precipitation and evapotranspiration) and landscape characteristics (geomorphology, relief, soil texture and depth) (de Ridder & Breman 1993). Especially landscape characteristics can account for small-scale, spatial variability in plant production. This spatial variability, which can lead to so-called resource reservoirs or high productivity patches, is very important to nomadic pastoralists in their search for suitable feed for their livestock. This will be touched upon later; in this context it is important to notice that one of the problems that the new paradigm has failed to address yet is spatial variability. The concepts of the new paradigm consider mainly temporal variability (Stafford Smith & Pickup 1993).
3.2.3 Vegetation and the effects of grazing

Individual rainfall events determine the short-term variability of the biological system, for instance, the presence or absence of ephemeral plants and the growth period of perennials. Sequences of rainfall events are responsible for long-term variability, for example, the establishment of woody shrubs (Stafford Smith & Pickup 1993). Both the growth rate and the species composition of vegetation are influenced by the pattern and amount of seasonal rainfall. The Sahelian rangelands, for example, are dominated by annual plants, mainly herbs; although shrubs and trees are present, they are usually few and scattered (Hiernaux 1996). The first rains trigger germination, and if moisture continues to be sufficient, the vegetation growth will continue until flowering (Breman et al. 1982). In areas with low precipitation, water is often the limiting factor for plant growth, but if sufficient soil moisture is available, the content of nitrogen and phosphorus in the soil usually becomes the limiting factor for vegetation production (Bremen & de Wit 1983). The transition point between water-limited and nutrient-limited production varies throughout the arid and semi-arid areas. In the Sahel, for example, plant production in areas with less than 250 mm available water per year is considered water-limited (de Ridder & Breman 1993).

The transition from humid forest vegetation to desert shrub is gradual and followed by a reduction of biomass per unit area. Under extreme aridity almost no vegetation is present except along wadis where plants with deep root systems are able to tap groundwater. In arid and semi-arid areas a remarkable variation in biomass exists from year to year in response to yearly moisture variations (Beaumont 1993). Grass production may range from nothing to several tonnes per hectare, depending on rainfall. The production is spatially differentiated and some areas show more stable patterns of primary production, while others are highly unstable (Scoones 1995). The quality of the biomass also varies, but in general the quality (with regard to livestock consumption) is better in the low rainfall areas5. In Sahel, for instance, the pastures in the North are high-quality and low-biomass, whereas the pastures in the South are low-quality, high-biomass (de Ridder & Breman 1993). Rangelands generally consist of annual and perennial herbaceous vegetation and often also of trees and shrubs. Annuals dominate in areas with low and mono-modal rainfall pattern, and perennials are more common in areas with higher or bi-modal rainfall. The yields of deep-rooted woody species generally vary less than those of herbaceous plants, but water availability still has an affect (Bayer & Waters-Bayer 1995).

Harrington et al. (1990) make a hierarchy of plant species according to animal selection in a time of abundant vegetation, such as after the rains:
1. The ephemerals will be eaten (they have a short life cycle anyway, so if they are not grazed they will simply wither).
2. Then the perennials take over. In areas without ephemerals, the perennials will constitute the first stage.
3. When the amount of palatable perennials is reduced, the palatable browse species will compose the main component of the diet.

5 Quality is often assessed by measuring the nitrogen content: the pastures in low rainfall areas usually have a high nitrogen content and are thus regarded high quality (de Ridder & Breman 1993).
There are species that will never be eaten due to lack of palatability, poison content or fibrousness. The above hierarchy forms a continuum from high quality/low durability to low quality/high durability vegetation. Annual species can be damaged by grazing at flowering time; however, many annuals have developed thorns and/or spikes as a defence against animals at this time (Thébaud et al. 1995). The fact that the majority of rangeland areas are dominated by annual species is often assumed to be an adaptation of originally perennial-dominated range to increased grazing pressure (Perevolotsky 1995, Warren 1995). Moreover, trampling can assist the burying of seeds, which is very important for certain species (Harrington et al. 1990). Animals act differently when it comes to selecting food. Cattle do not graze pastures as close to the ground as small ruminants and are thus easier on the vegetation. Also, cattle appear less specific in their selection of palatable species when vegetation is abundant, but they cannot subsist on ‘anything’ as especially goats can. The heterogeneity of precipitation and the vegetation selectivity of livestock causes patch-selective grazing to occur (Scoones 1989, Fuls 1992). The pastoralist can do very little about the selectivity of the animals; actual selection of stock, together with movement patterns, are their management tools. Nomadic pastoralists have adapted their migrations to these characteristics.

3.2.4 Fire and soil erosion

Fire has a profound effect on rangeland structure and growth. It can be caused by spontaneous lightning or by humans - both on purpose and accidentally. Fires reduce standing biomass and litter, and kill unprotected seeds, seedlings and plant tissue (Solbrig 1993). Burning can be used as a tool for range management as it alters species composition. Bush encroachment\(^6\), for instance, can be controlled by burning at the right time. Fire can remove unused herbaceous material left over from the previous growing season in order to develop new growth of higher nutritional value and greater vigour more accessible to livestock (Sandford 1983). Many pastoral groups have used fire for range management, but fire can be devastating unless the burn is started at the appropriate time, in the right vegetation, etc. (Kyagaba & Farah 1996).

Soil erosion takes place both during the wet and the dry season. During the wet season, erosion occurs when heavy showers fall on bare ground or where vegetation cover is low: water erosion. During the dry season the soil can blow away due to low vegetation cover: wind erosion. This can be exacerbated by the trampling of animals and by human removal of trees for firewood (Solbrig 1993).

3.3 Classifications of nomadic pastoralism

Substantial work has been done on the classification of nomadic pastoralists - or pastoral nomads. The key parameters for classification are the degree of mobility and agricultural involvement. However, length of movement and amount of agricultural work tell very little without a specific context (Barfield 1981). The classical typology of nomadic pastoralism is a division of the nomadic aspect into pure and semi-nomads; according to this, pure nomads have no agricultural activities of their own (Jacobs 1965). Often this typology has a further subdivision of pure nomads into desert and

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\(^6\) Refer to appendix 2 for a discussion of bush encroachment.
Some authors see a connection between climate and the type of nomadic pastoralism; Lamprey (1983) for instance claims that the drier the climate, the ‘purer’ the pastoralist. Jacobs (1965) is opposed to this view by demonstrating that the pastoral Maasai, who are pure pastoralists, occupy areas well suited for agriculture. One of the problems with this typology is the romanticism of nomadism, the view that pure nomads are ‘better’ than semi-nomads. An example is that semi-nomads are described as being more aggressively warlike (Jacobs 1965). Within this typology movement becomes an end in itself, and agricultural work is regarded as negative (Barfield 1981). The question is if these typologies can help our understanding of the nomadic pastoral societies. According to Barfield the answer is no:

“These typologies, legacies of cultural geography, have done more to obscure our understanding of nomadism than to bring about deeper insight into the nature of this way of life.”

(Barfield 1981 p.XIII)

For obvious reasons most of the classifications of nomadic pastoralists focus on elements perceived as crucial from an outsider looking in. However, these classifications often fail to work as analytical tools, because their predictive capacity is low. It can be concluded that nomadic pastoralists are difficult to classify. This is because they are as unstable as their ecosystems, or rather they apply flexible strategies adapted to disequilibrial ecosystems. The reason for this failure of classification might also be due to the perspective - the outsider looking in. Hence, classifications of nomadic pastoralists are not used in the present work.

3.4 Characteristics of the nomadic pastoral utilisation system

The characterisation of the nomadic pastoral utilisation system will not depend on classes of nomadic pastoralists for the reasons explained above. Instead a few key characteristics must be found.

Nature is often perceived the most important constraining factor in the nomadic pastoral system. Yet, nomadic pastoralists’ adaptive strategies are seen to cope with this constraint. As the previous section showed, the areas inhabited by nomadic pastoralists are both harsh and highly variable environments. However, this does not imply that the natural environment cannot be used in any other way than for nomadic pastoralism, i.e. that the environment excludes other means of exploitation. Like other constraints affecting human behaviour, environmental constraints are not absolute and can to some extent be overcome by investing money, energy and/or materials. It is the cost of these investments that constrains the human behaviour, not some magical law of nature (Solbrig & Young 1993). At present, however, the most accessible resource in African drylands is human labour. Thus, as long as there are no other alternatives, utilisation strategies should be adapted to a low input of money, fossil energy and materials. One of the utilisation systems adapted to a high labour input and a low economic input is nomadic pastoralism.

Nomadic pastoralism has to do with mobility and livestock production, as the expression indicates. In the following, characteristics of this system are provided, with emphasis on the strategies and characteristics that are adapted to the drylands. Hence, the first part concerns mobility and livestock production, and interaction with the
surrounding society. In this section aspects concerning politics, religion, ethnicity, the state, and history will also be touched upon, but only when these have an influence on the utilisation system. Then, external relations, such as exchange and interactions with agriculturalists, are discussed. Finally, the efficiency of the nomadic pastoral production system is evaluated.

MOBILITY
Prerequisites for nomadic pastoralism are, of course, suitable herding animals and forage for these. Moreover, in order for nomadic pastoralists to make the most of their mobility, they must have freedom of movement and unrestricted use of certain areas at certain periods of time (Widstrand 1975). Thus, the most obvious element of nomadic pastoralism is movement with the herd. Mobility is a flexible strategy, perhaps the most important flexible strategy of the nomadic pastoral utilisation system. The reasons for being mobile or nomadic are numerous. One of them is that movement enables the continuing search for food among fluctuating, low density resources, and it facilitates close tracking of favourable environmental conditions (Dyson-Hudson 1984); hence, the system of migration allows the range to ‘recover’ (Solbrig 1993). Another reason is that movement serves as a means of risk spreading (Widstrand 1975).

The major impetus for migration is seasonal changes; in this the nomadic pastoralists follow strict rules enforced by tradition (Sandford 1983). There are different kinds of movement from simple, seasonal, short distance migrations to complex, non-cyclic, long-distance migrations (Johnson 1969). Disaster migrations can be due to rinderpest or other diseases, or they can occur after a couple of severe drought years (as seen in the Sahel in the 70s). Most pastoral groups have resource reservoirs that are used as fall-back areas. These can be highlands, swamps, or permanent river beds, and are characterised as being spatially limited areas of better resources, providing green forage even late in the dry season, and often in proximity of water. Resource reservoirs experience temporal high stocking densities during periods of stress. Hence, the effective use of vast low-resource range depends on the existence of high-resource areas (Dyson-Hudson 1984) and the possibility of migrating to these areas. According to Sandford (1983) the lack of essential high-productivity reservoirs was a major factor in the disaster in the Sahel in the 70s.

LIVESTOCK PRODUCTION
Sheep, goats and cattle are the oldest domesticated livestock (Barfield 1993). The most common livestock kept by nomadic pastoralists in Africa are sheep, goats, cattle and camels. Nomadic pastoralists also use donkeys or horses for transport (Dahl & Hjort 1976). According to Jacobs (1965), all African pastoralists keep sheep and goats even if they call themselves cattle or camel herders. Livestock is kept for milk, meat, and in non-Islamic cultures the blood is also utilised. This means that the diet is very rich in protein, depending on the supplement of grains. Several authors have addressed the issues of the nutritional status and strategies (Casimir 1991, Galvin 1992, Galvin et al. 1994) of nomadic pastoralists. This is not discussed separately here, but the importance of the exchange of pastoral products for agricultural products is mentioned later in this chapter.
Herd composition, the keeping of different species of livestock, serves as a means of risk spreading because each species has its own needs, strengths and weaknesses. This is called herd composition. Another means of risk spreading is herd splitting. The idea is that the different grazing habits within the herd result in the use of different ecological niches and thus different chances of survival (Tadingar & Farah 1996). Herd splitting is often used in the dry season to make the most of scarce resources. Furthermore, each species has various needs in terms of water, for example, how often the animals require watering and how far they can walk. By splitting the herd according to species, the pastoralists exploit the strength of each species. The main constraint on herd splitting is that it is a labour-intensive strategy. The herder needs to be experienced and have knowledge of the animals and the landscape, especially the patches of high productivity. Movement, herd composition and herd splitting have been mentioned as risk spreading methods; yet another strategy of risk spreading is the system of stock friends or redistribution of stock. This means that one pastoralist group lends or shares stock with its stock friends. The rational behind this is that in case of disaster, there will be stock left with the stock friends (Gulliver 1955, Tostesen 1980, Bovin 1990). The last risk spreading strategy that should be mentioned here is the pursuit of supplementary activities as opposed to the reliance on livestock production as the sole means of food. Supplementary food securing activities include agriculture and wage labour (Juul in press), but also hunting and collecting. Honey, for instance, is considered an important supplemental activity in some areas (Mutungi et al. 1996). A more indirect means of security is trade and exchange-sale of animal products. The latter depends on the surrounding society. In general, the most mobile households are the most affluent as only few can afford to relinquish supplementary income from agriculture or other occupations which demand a certain degree of sedentary life (Juul 1994).

It has been mentioned that pastoral families aim at keeping larger herds than necessary for their immediate needs. This has supported the notion of irrational pastoralists, but there are several reasons for keeping a larger herd than needed on an average basis (Dahl & Hjort 1976): there are few ‘average years’ in arid and semi-arid areas, thus a large herd serves as insurance in case of drought years, and against diseases and raids. Cattle are also used as bridewealth (Gulliver 1955, Dombrowski 1993), and as a source of prestige (Solbrig 1993). There have been several attempts at calculating the necessary herd size (Widstrand 1975, Cox & Atkins 1979, Hjort 1990b). Although estimates of necessary herd size seem relevant, they do not capture the social importance of the herd, and thus the number of cattle necessary for an acceptable social life. A Karimojong says:

“Every man wants to find a wife, friends, happiness; to become a man of importance and influence. Without cattle he cannot achieve any of these things.”
(Quoted from Widstrand 1975 p.151)

The importance of livestock for the social systems should not be underestimated. In many pastoral societies cattle and camels are of the greater social importance, irrespective of primary economic importance of sheep and goats. Moreover, among societies in which livestock is only of secondary subsistence importance livestock tends to be very important for purposes of social exchange. For instance bridewealth is higher in pastoral societies relying on agriculture as part of the subsistence needs, compared to societies in which animal products are the prime means of consumption (Jacobs 1965).
Livestock are often considered the only means of investment for nomadic pastoralists (Tostesen 1980) and to some extent also for subsistence farmers in semi-arid areas (Njeru 1996). However, livestock capital is extremely liquid: it is prone to raids and can thus disappear overnight, it can be wiped out by rinderpest or other diseases, or die because of severe droughts (Widstrand 1975). On the other hand, a study from Lesotho showed that investment in cattle earned the equivalent of 10% interest rate, whereas a bank account lost 10% due to inflation (Bayer & Waters-Bayer 1995). Hence, investment in livestock might prove the best investment for many rural people.

In general one speaks of two different management systems regarding stocking strategy, namely conservative and opportunistic\(^7\) stocking management. In brief the difference is that with conservative management the stock number is constant, adjusted to the lowest or average number of stock the land can support on a long-term basis (i.e. several years); with opportunistic management the stock number is changed according to changes in the amount of vegetation, etc. (Sandford 1983). Several studies have shown that opportunistic stocking is the most appropriate for pastoral systems of Africa (e.g. Abel & Blaikie 1990, Young & Solbrig 1992, Behnke 1994, Thébaud et al. 1995). The main reason is that vegetation is utilised in the most suitable manner. In good years, for instance, conservative stocking will cause under-exploitation of pasture and hence an accumulation of biomass which can hinder plant growth in the following years and even result in a lower production (Thébaud et al. 1995). Nomadic pastoralism has been labelled semi-opportunistic, because livestock numbers do not always follow vegetation variations. For instance, restocking and destocking are often slow compared to the changes in the vegetation (Sandford 1995).

Livestock productivity is mainly determined by nutrition, rather than by water availability, or animal health problems. Hence, biomass production (primary production) and the nitrogen content\(^8\) of the herb layer as well as browse, can be used to estimate livestock production (secondary production) (de Ridder & Breman 1993). The persistence of livestock populations in times of disease and drought has surprised many scientists, although there is disagreement on the consequences of epidemics (Mung’ong’o 1995). Livestock populations that experience profound reductions can manage to increase again in most cases. The explanation is that persistence is assured not only by the expansion of the spatial range of resource use (through migration), but also through the exploitation of local spatial heterogeneity, and hence the use of local high-productivity patches (through local foraging behaviour) (Scoones 1993).

Finally, it should be mentioned that these are general characteristics and therefore vary from area to area as well as from group to group. Differences in characteristics can be due to religion. Among Muslim pastoralists, for instance, blood is not considered a livestock product for consumption. Hence, they do not practice “bleeding of livestock” and when an animal is slaughtered the throat is simply cut and the blood runs out onto the ground. Differences in characteristics can also be due to differences in the environment. Dahl & Hjort (1976) and Western & Finch (1986) argue that the difference in production strategies between East African pastoralists and Sahelo-Sudanic pastoralists has its basis in the difference in rainfall regime, namely from a bi-modal to a mono-modal. The bi-modal rainfall situation of East Africa is typified by

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\(^7\) Opportunistic strategies are also called \(r\)-strategies (Sandford 1983).

\(^8\) The most important variable in pasture quality is nitrogen content (de Ridder & Breman 1993).
Characteristics of the nomadic pastoral utilisation system and its natural environment

relatively localized and erratic movements, whereas the mono-modal rainfall regime of the Sahel results in large-scale north-south movements (Scoones 1995). However, this might appear rather nature deterministic, and it is important to keep in mind that rainfall regimes and other physical parameters such as the landscape are not the sole determinants of movement patterns; social and ethnic relations are other important factors.

EXTERNAL RELATIONS
The description of external relations is divided into five parts. The first three sections are closely related: the first concerns the direct exchange of pastoral and agricultural products in an energetic perspective; the second part relates to exchange relations in an economic sense; and the third part concerns the interactions between the pastoral and the agricultural production system. The fourth part presents an idea of the interaction between the nomadic pastoralists and the surrounding societies called ‘the ecological trilogy’. Finally, the fifth part presents a brief discussion of nomadic pastoralists and the state. Hence, external relations are discussed in a wider perspective in each section.

Exchange relations in an energetic perspective
The direct exchange of pastoral and agricultural products is probably the oldest exchange relation (McIntire et al. 1992). When considering an ideal pastoralist and an ideal agriculturalist, the exchange of products is a rational exchange from an energetic point of view. The pastoralist produces animal products that are ‘expensive’ in terms of input energy. He can live on a pure high-protein diet, i.e. milk, meat and blood, but the amount of protein exceeds what the body needs; therefore, the protein is metabolised as mere carbohydrate. Hence, the protein might as well be exchanged for carbohydrates such as grains. Grain, on the other hand, is energetically cheap to produce. Hence, an agriculturalist who produces grain and keeps no livestock might have enough calories to support his diet, but he needs protein. Depending on the terms of trade, both pastoralists and agriculturalists can benefit from the exchange of animal and agricultural products. Pastoralists have surplus protein and are interested in achieving more calories while agriculturalists have surplus calories and need protein (Hjort 1990b, Gefu 1992). Often the terms of trade have been beneficial to both the pastoralist and the agriculturalist.

Exchange relations in an economic perspective
One of the problems when considering exchange in a purely energetic perspective is the lack of information on exchange rates. With the risk of oversimplifying, two economic situations can be characterised. The first is the normal situation where exchange between the agriculturalists and pastoralists is beneficial to both groups. Obviously, prices vary according to supply and demand, which are often related to the season. Both groups seek to sell when the exchange rates are highest and buy when the exchange rates are lowest.

The other situation is the case of drought, or for pure pastoralists, simply the dry season. In this case the pastoralist sells livestock or livestock products for mere survival and does not consider the prices (Bovin 1990). In the 1970s this was a common reaction from drought prone pastoralists, and Westerners who experienced it labelled the reaction ‘perverse supply-response’ or ‘perverse price-response’ (Dahl & Hjort 1979, Hjort 1981). It was perverse in the sense that the majority of products were sold when the prices were lowest. In most cases it concerned the sale of live animals at the middle or end of the dry season when the animals were in poor condition and the prices
low (both due to the condition and the supply). It appears strange that pastoralists do not sell their stock when the prices are high, which usually is at the end of the wet season. However, at this time pastoralists are usually ‘well off’, hence they do not sell the stock until late because they hope they can manage through the hard time without selling.

Interactions between pastoral and agricultural systems
The exchange between pastoralists and agriculturalists is often part of a larger system of interaction between the two production systems. In this context the term interaction is used for the relation between the two systems, while integration denotes relations within one system - agropastoralism. Bayer & Waters-Bayer (1995) list the following links between agriculture and pastoralism: food links, forage links, manure links, draught links, investment links and employment links.

The food links have been mentioned above. The forage links and the manure links can be described as one interaction. It involves grazing of stubble fields and village pastures by pastoral herds. The manure dropped while the herds graze or collected from the ‘kraals’ is often the only input of nutrients, and hence highly valued. The draught links are not considered important, as the agriculturalist most often buys his draught stock, hence the link changes to competition (McIntire et al. 1992). The investment links and the employment links can also be characterised as one interaction. When agriculturalists invest in livestock they can pay pastoralists to take care of the herd. The payment can be in cash or grain, but most often the pastoralists receive milk and perhaps some of the off-spring (McIntire et al. 1992).

According to McIntire et al. (1992) the specialisation in pastoralism and agriculture depends on population density - an important precondition for this is that both systems are equally feasible. As long as density is low, it is most profitable to be specialised. When population density increases both agricultural and pastoral production becomes diversified and hence the two production systems start to compete for resources. Moreover, a property rights conflict between agriculturalists and pastoralists starts (Brink et al. 1995). With further population growth and increased access to the market, specialisation becomes the most viable strategy again (McIntire et al. 1992). But this strategy also implies a change from subsistence production to market integration and hence increased commercialisation.

The Ecological Trilogy
This idea has been described by English (1973) and has been developed for the nomadic pastoral societies that existed in the middle East and North Africa centuries ago⁹. The trilogy consists of the three types of communities that were present namely the city, the village, and the tribal nomads, each of which was rooted in a different physical environment. These communities interacted in a way made to fit the environment, the culture and the institutions of Islam. Each community produced its own distinctive products; however, people sought to minimise risk by combining a variety of pursuits - trade, farming and herding (English & Miller 1989). The cities were the cornerstone of Islamic civilisation, having a mosque and a permanent market place - the bazaar. Networks of caravan trails usually owned by nomads linked the cities to one another. The villages were the economic foundation of the society with the majority of the population living here (English 1973). They were rural communities that supplied the cities with grain and other foodstuffs in return for goods and services. Also, they

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⁹ Here emphasis will be given to the elements relevant for (nomadic pastoralists in) North Africa.
exchanged grain for meat, milk and wool with nomadic pastoralists. The villages were located wherever there was a reliable water supply (English & Miller 1989). Different varieties of nomadic pastoralism existed; English describes these types of nomadism as ‘a highly rational adaptation of human life to local resources that enables a substantial number of people and animals to subsist in severely restricted environments’ (English 1973 p.156). Nomadic pastoralists with large-scale movements were often in charge of the caravan trade. They gained access to agricultural products by controlling agriculturalists in the oases. In southern the Sahara, for instance, the Tuareg owned a slave caste of black farmers, the Haratin. In areas where nomadic pastoralists did not directly own the oases, sedentary farmers paid tribute, the so-called ‘brotherhood tax’, to the pastoralists for protection of the oases. Other groups of nomadic pastoralists were engaged in exchange with local agricultural communities where livestock and dairy products were exchanged for cereal and other non-pastoral products (English 1973).

It is appreciated that the ecological trilogy is a description of life in North Africa and the Middle East centuries ago which reveals the interactions among the three major groups in the society. The value of the ecological trilogy is that nomadic pastoral societies are placed in a socio-economic context, but the characteristics of nomadic pastoralism as such are similar to characteristics found elsewhere.

Nomadic pastoralists and the state
The most important aspect of nomadic pastoralism and the state is probably that administrators in African countries (except Mauritania and Somalia) tend to come from ethnic groups of agricultural origin, rather than pastoral origin (Horowitz & Little 1987). This means that the agricultural population is favoured at the expense of the pastoralists. Moreover, this often happened during colonialism (Bovin & Manger 1990). Thus, nomadic pastoralists are politically weak (Sandford 1983). With this in mind it cannot come as a surprise that nomadic pastoralists often feel a stronger obligation to their own social system and rules than to the state (Widstrand 1975). Nomadic pastoralists are generally tribal in and nature dominated by kinship relations, but most of all they function as individual households, comprised of a simple or an extended family (Stenning 1962, Barfield 1993). However, it is especially the nomadic aspect of nomadic pastoralism that annoys politicians, because nomads cannot be organised in ways preferred by the state10 (Widstrand 1975). State policies can influence nomadic pastoralists in a number of ways. It is beyond the scope of the thesis to discuss them separately here, therefore political influence (both national and international) will be mentioned when relevant to the context. Said (1994) is a good example of the importance of politics for a pastoral group in Ethiopia.

3.4.1 Efficiency of the nomadic pastoral production system
When discussing the efficiency of nomadic pastoralism as a utilisation system there appear to be two main points. First, there is the comparison of nomadic pastoralism and agriculture in Africa. Then, there is the comparison between African pastoralists and pastoralists in other parts of the world, mainly in developed countries such as Australia and USA.

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10 Refer to special issue of *Nomadic peoples* 1990 No 25-27 for a discussion of pastoralism and the state.
With regard to the first point it is a general notion, especially among anthropologists, that pastoralists make use of land that cannot be utilised better or in any other way at all (e.g. Flou 1977, Barfield 1993, Mannion 1995). However, this can be discussed in areas where agriculture and pastoralism are equally feasible. First and foremost, pastoralists’ main energy converters are animals. This means that instead of using plants, pastoralists rely on the bio-energetic detour of animals as energy converters. This means they lose at least 90% of the energy compared to grain production. In the case of nomadic pastoralism, the energy loss from conversion of vegetation to animal products is likely to be higher than the 90%. There are several reasons for this:

- The animals use much energy on the migrations. The energy spent on migrations could be used to produce milk or meat and thus give the pastoralist a higher output.
- The animals get old. There is a low off-take rate in nomadic pastoral systems, and in general, a high off-take rate means a high energy efficiency. In case of the nomadic pastoral system the animals are not slaughtered when they have reached the maximum weight compared to energy input.
- The animals starve. The reproduction capacity of livestock is reduced during periods of nutritional stress (McCabe 1987).
- The animals die. Both droughts and diseases kill animals, a fact which is anticipated by the pastoralist, who therefore keeps a higher number of livestock than necessary for survival in the short-term perspective (Dahl & Hjort 1976). When animals die, especially in large numbers at the same time, it means that animals have been kept without being used, or only used to a very limited extend.

Generally, this means that the loss of energy from the conversion of vegetation into animal products in a nomadic pastoral utilisation system is likely to be 95-98% (refer to Coughenour et al. 1985 for an analysis of energy use in a pastoral system). This might appear irrational from the point of view of energetics. However, the basic concern of the system is not to achieve a high energy efficiency but to obtain a reasonably stable production. This is done through means of risk spreading which, as it is appreciated, in turn means a lower food-chain efficiency.

Cultivation provides a more energy efficient means of land use in semi-arid areas, as the “expensive” animal link of the food-chain is avoided. Many of the areas used by nomadic pastoralists can support grain production in general, but in drought years the solutions to harvest failure for the agriculturalists are few. Moreover, it is especially the buffer zones of the nomadic pastoralists that are suitable for cultivation. By withdrawing these from agricultural purposes the nomadic pastoralists lose their possibility of dealing with droughts. Brink et al. (1995) have tried to illustrate the comparative advantages of agriculture and pastoralism in the Sahel. They conclude that nomadic pastoralism is the most viable production system in the North, but due to the theoretical character of their work, they cannot determine at what latitude this changes.

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11 It is often claimed that through every link in the food-chain only 1/10 of the energy input becomes energy output (Fog 1988).
12 The implication of drought on livestock populations can be described as a three-phase process. First, there is a significant reduction of the herd size with increasing mortality rates as the drought prolongs. Then there is a stabilising period, during which there is a low calving rate but also low mortality. Finally, there is the recovery phase in which livestock numbers increase. The time necessary for the herd to obtain pre-drought size depends on the type of animals, the number of subsequent good seasons, and the size of the remaining herd (McCabe 1987).
and agriculture becomes the most viable. Moreover, the viability of pastoralism is also determined by the degree of mobility and flexibility of the land tenure regimes.

The comparison between pastoralism in Africa and in the developed world (where it is often called ranching) will now be considered. Although every nomadic pastoral system in Africa has its own unique energy flow characteristics, some generalisations can be made. Some of these have been mentioned above, others include that most of the energy produced in the system is also used within it, and the slight export of animal products is usually part of an exchange system to obtain other food products, mainly grain, or essential goods. Finally, nomadic pastoral systems rely solely on solar-power which means that there is little or no fossil-fuel energy involved in the production (Mannion 1995). Some researchers argue that nomadic pastoralism is very energy efficient compared to livestock rearing in similar environments in Australia and USA (e.g. Breman et al. 1978, Breman & de Wit 1983, Upton 1986) or ranching/commercial pastoralism in Africa (Behnke 1985). The question is if the two systems are comparable or if anything is to be learned from a comparison of nomadic pastoralists in Africa and pastoralists or ranchers in the developed countries (see Ellis et al. 1979, Cox & Atkins 1979 for a comparison of the energy flow of grazing systems in different parts of the world). The objectives of production are very different: the former is mainly for subsistence needs and the latter is a commercial system. Moreover, neither of the systems has been created with energy efficiency as a prime goal, and the issue of concern is therefore rather how the systems can make the most of the harsh environments within which they exist with the technology available.

3.5 Selection of main themes

The analysis of the nomadic pastoral utilisation system is concentrated around three main themes as mentioned in chapter 1. The three themes are:

- Availability and use of range and water
- Tenure systems
- Exchange or market relations

Common to these interrelated themes are that they all evolve around management of the nomadic pastoral utilisation system and that they all include the relationship between the nomadic pastoralists and the surrounding world. Management of the utilisation system includes almost all aspects of land and livestock tenure, some aspects of herd management, as well as manipulation of the range to increase its productivity, and building of watering points, and aspects of the handling of products through exchange or market relations. Management includes aspects of planning for future provision of resources and can therefore be related to discussions of pastoral development (Sandford 1983).

It is widely accepted that nomadic pastoralists, although isolated and independent in appearance, have close connections to, and are profoundly affected by the surrounding world (Behnke 1985, Bovin & Manger 1990, Njeru 1996). For instance, the availability and use of range and water is not only an internal nomadic pastoral matter: Agriculturalists have caused problems by encroaching on pastoral areas (especially resource reservoirs), and at the same time, many pastoralists have become more
engaged in agricultural activities; obviously, this situation affects the relationship between pastoralists and agriculturists and the use of the range. **Tenure systems** in African rangelands are currently undergoing changes, and there is no question that decisions made outside the nomadic pastoral system have profound effects on the future conditions for pastoral production. Most **exchange and market relations** have been with agriculturalists; for some nomadic pastoral groups the relations have been well established for centuries, for others, the relations are new or unstable. There is no doubt that the nature of the relations will change with the closer integration of nomadic pastoralists in the surrounding society.

There are many interrelations among the three themes, hence the discussion is difficult to separate. For example, encroachment of agriculturalists into pastoral resource reservoirs inevitably leads to closer relationships and often includes exchange systems or sometimes even the establishment of a market. As the management of the range depends on the use, land management (availability of range and water) and land allocation (tenure systems) cannot be separated (Sandford 1983). New tenure systems often only acknowledge right over cultivated land, thus some nomadic pastoralists start cultivating (to keep their right) and start producing the products they obtained via exchange and market relations.

Hence, the reason for choosing these themes is that they are all highly relevant for the understanding of nomadic pastoral utilisation systems. They are especially relevant in relation to the investigation of the development these systems have undergone through the past century and the future possibilities for nomadic pastoral utilisation systems.

### 3.6 Summary

In arid and semi-arid areas rainfall is not only low, falling in short periods interspersed by long dry periods and in reality, highly variable in both amount and timing. This means that plant growth is limited to short bursts, generated by the rain, separated by long periods of quiescence. The new understanding of the functioning of these ecosystems, described as the new paradigm in chapter 2, applies to all the areas defined as arid and semi-arid in this thesis, but to a varying extent.

In order to cope with highly variable and unpredictable environments, nomadic pastoralists have developed a number of strategies. These include avoidance of risk by moving herds to make best use of the heterogeneous landscape, herd splitting and composition, and economic diversification to support their livelihoods. Interactions with the surrounding society involve exchange and trade especially with agriculturalists, but in certain areas the importance of nomadic pastoralists as traders has been significant.

One can conclude that while nomadic pastoral utilisation systems may appear fragile, in reality they are flexible systems operating within highly variable environments.
Chapter 4

THE ORIGINS AND SPREAD OF NOMADIC PASTORALISM

*Man wanders in all parts of the world without exception,*  
*often in some areas, in others more seldom.*  
*He wanders alone or in families, in groups or in tribes*  
*- sometimes a whole people together -*  
*from the dawn of history until our days*¹

In this chapter an overview of the development of nomadic pastoralism and the adaptive capabilities of this production system is given. This is done in order to help our understanding of the dynamics of the system, and thus improve our idea of the future possibilities for nomadic pastoralism.

The development of nomadic pastoralism is explained both theoretically, as a production system seen in relation to the stages of development², and practically, through a discussion of the origins and spread of nomadic pastoralism in Africa. The theoretical part consists of three subsections: first, possible forces driving the development of nomadic pastoralism are outlined; second, the stage preceding nomadic pastoralism is discussed; and finally, the age and dating methods of nomadic pastoralism are discussed. In order to deal with these issues, one should know about the prerequisites for this cultural form and the evidence that can reveal its existence. These subjects will be touched upon when necessary.

Before proceeding it is important to note that considerable confusion arises from the difficulties of adequately defining nomadic pastoralism with respect to archaeological investigations. Therefore, some of the following controversies might be due to discussions of quite different phenomena that are confused under the same concept.

### 4.1 The evolution of nomadic pastoralism

Some uncertainty arises when discussions concerning the domestication of animals are mixed with the discussion of the origins of pastoralism. It is obvious that these two issues are related, but are not the same thing. It should be emphasized that it is the origins of pastoralism that is of relevance for the present work.

#### 4.1.1 Driving forces

In order for pastoralism to evolve, there must be either domesticated animals available or wild animals suitable for domestication. Furthermore, there must be forage and water within reach of the animals. Other necessary conditions for the existence of nomadic pastoralism are: appropriate technology and social relations for domestication and for continuous herding (Cribb 1991).

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¹ Kant 1962 p.342.
² Refer to appendix 2 for a discussion of the use of the concept ‘stages of development’.
Thus, some theories focus on a change in the availability of animals and/or pastures as the driving force for the development of nomadic pastoralism. One theory (Smith 1992) has to do with climatic changes towards a drier environment, which led to intensified relations between hunters and animals. When resources such as pasture and water became scarce, humans and animals tended to be attracted to the same areas and a domestication of the animals could have been a natural consequence. The idea of an intensified relationship between humans and animals in dry areas or dry periods has been elaborated by Philips (1965). However, he comes to a different conclusion as far as the origin of herding is concerned:

“The most plausible theory for the origin of herding is that it arose from agriculture in places where the wild animals grew accustomed to feeding on plants cultivated by men. This would most naturally happen in countries of little rainfall, where the best watered ground near springs and rivers would often be occupied by human cultivators. Though they would not be welcome at first, the animals under stress of hunger would be persistent visitors and become familiar with the sight of man.”

(Philips 1965 p.17)

Cribb (1991) supports the idea that nomadic pastoralism has evolved from agriculture. He puts forward several hypotheses based on the idea that nomadic pastoralism emerged with the intensification of irrigated agriculture. One hypothesis suggests that nomadic pastoralism was a means of supporting the growing cities with pastoral products, and thus a viable specialization of irrigated agriculture with domestic animals. Another hypothesis proposes that nomadic pastoralism was an alternative strategy for those unable to cope with agricultural intensification. The common trend in these hypotheses is the idea of the existence of irrigation agriculture with domestic animals, or what could be termed sedentary pastoralism, as the springboard for nomadic pastoralism.

Boserup (1965) also discusses the origins of pastoralism. She points out that clearing of the forest left the land open for the invasion of grass, and hence, natural fodder for herbivorous animals became available. This leaves, according to Boserup, two possible options for the development of nomadic pastoralism. The first is that nomadic pastoralists developed from agriculturalists who cleared plots in the forest for cultivation and thus ended up having natural fodder for animals. The second is that the nomadic pastoralists developed into agriculturalists, when the population became too numerous to subsist on the grazing of animals in natural grasslands (Boserup 1965). Hence, nomadic pastoralism has developed from hunting according to the second option. The author herself does not eliminate either of the theories, but she seems to be most convinced by the former.

According to Smith (1976), the incentive to change from any stage of development to nomadic pastoralism should be that a change can provide opportunities to solve a constraining situation compared with the previous stage. Smith states that a new stage should improve ‘the productivity...the amount of effort required...the degree of risk of failure’ (Smith 1976 p.7). Hence, the change of development stage can be understood in ecological terms of productivity and security.

It can be concluded that there are several theories concerning the origins of nomadic pastoralism. They have three main themes:
1. A change in availability of animals and/or forage for these.
2. Intensification of (irrigated) agriculture.
3. Food productivity and security.

It appears that these theories have been developed against different backgrounds depending on which development stage is assumed to be the starting point. This leads to the next question: What was the development stage preceding nomadic pastoralism? The main dispute within this area concerns whether nomadic pastoralism developed from hunting or agriculture. In the following section, some of the arguments concerning the preceding stage of development will be outlined.

### 4.1.2 Preceding stage of development

Nicolaisen (1963b) has constructed the following diagram of the stages of development, and thus of the development of nomadic pastoralism.

![Diagram of stages of development](image)

**Figure 4.1** The stages of development according to Nicolaisen (Christiansen 1992 p.55).

It can be noted from the figure that pastoralism can originate from both hunting and agriculture. This is unusual since most authors believe in either one or the other origin. The archaeologist Smith, for instance, claims that nomadic pastoralism originates from higher hunting (Smith 1992). Other authors suggest that pastoralism originated from
sedentary agriculture (e.g. Bobek 1962, Philips 1965, Khazanov 1984, Barfield 1993). Hahn claims agriculture is older than nomadic pastoralism throughout the world and that the latter therefore originates from the former (Nicolai sen 1963b). Steensby agrees that nomadic pastoralism has developed from agriculture; he sees semi-agriculture as the developmental background. Nicolai sen comes up with a compromise, saying that nomadic pastoralism developed among semi-agriculturalists, where women did the farming and men were higher hunters (Nicolai sen 1965).

It is tempting to think that part of the disagreement is due to the pastoral group studied. This seems apparent when studying the theories that have their empirical background in studies of reindeer nomadism (reindeer keeping nomadic pastoralists). For instance, the Danish scientists Vahl & Hatt (1924) and the Finnish scientist Sirelius have come to the same conclusion on basis of their individual studies of different groups of reindeer nomads, namely that nomadic pastoralism has evolved on the basis of a hunting culture (Nicolai sen 1963b). Recent studies (e.g. Ingold 1980, Aikio 1989) also indicate that reindeer nomadism has evolved from higher hunting (of reindeer). Ingold (1980) explains which changes in ownership a transformation from hunter to pastoralist will cause, and claims to be able to prove that these have actually happened. Moreover, he claims that the pastoralist lifestyle which Vahl & Hatt and Sirelius studied in the beginning of the century has now developed into what he terms ranching.

Some authors claim that nomadic pastoralism in Africa has developed from hunting (e.g. Ambrose 1984, Gifford-Gonzalez 1984, Smith 1992, Marshall 1994). One of the arguments is that there is no evidence of grain domestication at the time when domesticated animals can be seen (Smith 1992). While domestic stock were common in the Sahara and the Sahel c. 7000 BP, cultivation in these areas was not carried out until c. 4000 BP (Nicolai sen 1996a). This means that the people taking up this new production system were hunters, although the domestication of animals might not have been carried out by the hunters (this will be discussed later).

4.1.3 Age and dating

There is not agreement on the age of nomadic pastoralism as a cultural form. According to Cribb (1991) existing theories of the origins of nomadic pastoralists tend to concentrate on two periods:

1. Nomadic pastoralism is regarded as an outcome of the intensification and specialization of agriculture that was only possible with the development of complex (i.e. urban) societies. This idea has mainly been supported by social anthropologists and historians.

2. Nomadic pastoralism originates from the Neolithic period. This has mainly been the argument of archaeologists.

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3 It should be noted that Vahl & Hatt (1924) also pointed out that the present lifestyle among reindeer nomads have been heavily influenced by agriculturalists; a point he proved through studies of the similarities in the otherwise quite different languages of reindeer nomads and agriculturalists.

4 It is worth mentioning that archaeologists often use the term “pastoral Neolithic” to describe cultures of Africa that relied on domestic stock for their livelihood, used pottery and employed typical Later Stone Age technologies for manufacturing of tools (Barthelme 1985). Thus, pastoralists might not be nomadic according to this use of the terminology.
It seems reasonable that archaeologists tend to place the time of origin earlier than those concerned with historical data. However, this also seems to be a discussion of where the various scientists have searched for evidence. The first theory has its main supporters among people studying Asia (e.g. Khazanov 1984, Cribb 1991) and the latter among researchers having Africa as their field of study (e.g. Smith 1992, Marshall 1994).

Pastoralism can be dated on the basis of finds of skeletons of domesticated animals, as Smith explains:

“...only with the evidence of genetic manipulation of the animals and some physical changes being recognized can we be sure of domestication and the beginnings of a pastoral way of life.”

(Smith 1992 p.54)

Findings of supposedly domesticated animals do not automatically indicate the presence of nomadic pastoralists as the animals might have been tamed by agriculturalists. Only with the lack of evidence of agricultural activities as well as any permanent kind of housing at the site, does it seem likely that the animals have belonged to nomadic pastoralists. It is appreciated that part of the disagreement arises due to the lack of evidence of movement - the nomadic aspect of nomadic pastoralism. Nomadic activities are predicted to be virtually invisible archaeologically in seasons of high mobility, and marginally visible in those of minimum mobility (Bradley 1992).

Evidence of the existence of pastoralism can be seen on ceramics (Ambrose 1984), sheep and pottery are generally assumed to part of the “pastoralist package” in Africa (Sealy & Yates 1994). Evidence can also be found in graves (Philips 1965); thus Cribb (1991) refers to mural paintings from c. 1900 BC showing what is supposed to be a nomadic group on migration. It is not unusual to date domesticated animals indirectly, by association. However, the beginnings of pastoralism cannot be traced on the basis of dating by association (Sealy & Yates 1994)

It can be concluded that the origins and presence of ancient nomadic pastoral groups, however these are defined, are as yet unproven by the available archaeological and historical evidence.

4.2 The origins and spread of nomadic pastoralism in Africa

The question of when pastoralism in Africa first occurred is still unanswered. The archaeological evidence provides the following picture of the origins and spread of pastoralism in Africa: Smith (1992) claims that the earliest indication of pastoralism goes back to shortly after 7000 BP; according to Lubell (1984) there was a widespread pastoral economy with domestic cattle in the Sahara c. 8000 BP, and finally Williams (1984) says that pastoralists appeared after the lake levels had lowered c. 10,000 BP. Nicolaïsen (1996a) reports that a distinctive form of pastoralism had developed in North Africa by c. 7000 BP. This coincides with a climatic change in the Sahara from a wet period to a drier climate with extensive grasslands and shallow lakes (Marshall 1994).

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5 When wild animals are tamed and used for reproduction, the size of their offspring will decrease within few generations due to restrictions of the gene pool (Smith 1992).
Again it should be emphasized that evidence of pastoralism is not automatically evidence of migrating people, i.e. nomadic pastoralists.

As mentioned in chapter 3, cattle, camels and small ruminants are the most common pastoral livestock. Small ruminants were introduced to Africa from West Asia where domestication (c. 9000-7000 BC) was linked to agriculture and settlement (Nicolaisen 1996a). The wild Bos primigenius is by some authors assumed to be the ancestor of domesticated cattle in the Sahara (Clutton-Brock 1989a, Smith 1992), but the traditional view is that domesticated cattle in Africa originated in the Near East (Marshall 1992). There is a consensus among authors (e.g. Barthelme 1984, Clark & Brandt 1984, Lubell 1984, Smith 1992) that the place of origin is the northern part of the continent and there is evidence of a spread of pastoralism from the Sahara southwards, although the cultural association is yet unclear (Smith 1992). Some cultural traits are held in common by pastoral societies, for instance pottery, tools, bones of cattle and rock paintings. These are used for dating of (the spread of) pastoralism in different areas of Africa. However, there does not seem to be a single geographical point from which all these elements emerge (Smith 1992).

The spread of pastoralism in Africa is believed to be closely linked to the distribution of the tsetse fly. The minimum rainfall for the tsetse is 500 mm, hence with the climatic changes and thus the variation in the location of the 500 mm isohyet the area suitable for pastoralism has changed. Therefore, it is believed that the spread of pastoralism has followed the environmental changes (Clark & Brandt 1984). For instance there is evidence that the North African pastoralists’ response to increasing aridity and environmental aridity was a southerly movement (Marshall 1994). By 4500 BP the more arid climate lead to an expansion of the tsetse-free area, and consequently, to an increase in the number of pastoralists, while increased rainfall c. 3300 BP made pastoralists abandon their sites (Smith 1984). Gifford-Gonzalez (1984) elaborates this theory by saying that a stressed overall ecological situation will lead to a higher likelihood of deviation from hunting as the major means of obtaining the diet.

If we accept the notion that nomadic pastoralism in Africa has its origin in the Sahara 7-8000 years ago and has spread southwards following climatic variations, we still need to know the route and the time taken. By looking into archaeological records we can get an idea of this.

By the sixth millennium BP pastoralism was widespread in the Sahara in co-existence with hunting in the southern parts (Smith 1984). At this time there is also evidence of pastoralism in North Africa; in eastern Algeria Lubell (1984) reports of the existence of a so-called transhuman pastoral economy without cultivation c. 6500 BP, and in Libya cattle and small-stock first appeared after 7000 BP (Smith 1992). According to Clark & Brandt (1984) pastoralists moved southwards from the Sahara in the fourth or fifth millennium BP, which supports Smith’s (1984) idea of the onset of a dry period and thus a spread of pastoralism. There appears to be some conflict about when nomadic pastoralism first occurred in east Africa, although there is consensus that it was introduced from the North (Ambrose 1984, Brandt 1984, Barthelme 1985). According to Robbins (1984), pastoralism was established around Turkana slightly after 5000 BP. This conflicts with the work of Robertshaw (1989) and Rightmire (1984), who claim the

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The origins and spread of nomadic pastoralism

earliest domesticated animals in Kenya arrived c. 3000 BP. Finally, Marshall (1994) compromises by saying that pastoralism has existed for a minimum of 4000 years in East Africa.

The spread of pastoral people into southern Africa may have been caused by pressure from agriculturalists around 2000 BP (Smith 1992). The pastoralist influence is believed to have come from East Africa through Botswana into South Africa (Klein 1984), although Sealy & Yates (1994) point out that domestic animals may have been brought to South Africa more than once, via different routes. It is believed that the local herders in southern Africa were hunters and collectors who acquired stock from the North (Marshall 1994). By looking at the skeletons of hunter/collectors and pastoralists, it is clear that it was not a new group of people altogether who came and took over the pastures. The skeletons of hunter/collectors and pastoralists are physically very similar, in contrast to the remains of agriculturalists (Klein 1984). On the other hand, pastoralism could not have evolves in southern Africa, but must have been introduced since the domesticated animals have no antecedents in the wild fauna (Pennington & Harpending 1993).

Finally, it should be emphasized that the identification of Africa’s pastoral past is an interpretation since the archaeological data is incomplete. Although pastoralism may be perceived as having one single origin from the above, it appears more likely that pastoralism is a fluctuating means of livelihood that has developed at various points in time and at different places.

4.3 Discussion and summary

The change to a nomadic pastoral utilization system obviously influences all aspects of the society. The most important issue is often considered to be the change from a food extracting system to a food producing system (Ingold 1996). In the following section some of the implications of changing to nomadic pastoralism will be discussed with respect to the preceding development stage.

If nomadic pastoralism has evolved from higher hunting, the change from a food extracting society to a food producing society will inevitably have introduced changes in the social structure. For instance, the relationship between man and animals is not one of ownership for the hunter. The animals are regarded as an open resource that, while being extracted, is not manipulated in any way. For the pastoralist the domestication of animals gives the opportunity of accumulating wealth. This makes it possible for a hierarchy to develop among herders as opposed to the hunter and collector society which by nature is egalitarian (Smith 1992). However, nomadic pastoralists societies are often considered egalitarian by nature (Dich 1989). Nomadic pastoralists recognize rights over live animals while hunters do so over dead animals (Ingold 1980). This causes a change in mentality from the hunter’s role, as the predator of the herd, to the pastoralist’s, as the protector of the herd. These can be regarded as ecological opposites, while the change from sharing to accumulation can be regarded as social opposites (Ingold 1980).

If nomadic pastoralism has evolved from agriculture, this has other implications for the society. It is important that the change from agriculture to pastoralism is not a change
from a food extracting to a food producing society (although for instance semi-agriculture also can be food extracting). Agriculturalists and pastoralists value animals differently. For the pastoral economies, females in the reproductive age are the most valuable; only a few males are needed for reproduction purposes. Among most agriculturalists more males are kept for meat supply and for traction power if needed (Kerven 1992). Another difference is the mobility, however, little is known about prehistoric pastoral movement patterns, and early stages of agriculture make use of moving the fields as well as the homestead (Harris 1996a).

As far as the origins of nomadic pastoralism are concerned, three possible driving forces have been outlined: A change in the availability of animals and/or forage for these, intensification of sedentary agriculture, and finally food productivity and security. These are closely linked to the possible stage preceding nomadic pastoralism. If, for instance, the idea of hunting as the preceding stage is accepted, intensification of agriculture cannot be accepted as the driving force.

Figure 4.2 shows the author's idea of the origins and development of nomadic pastoralism in Africa considering the available evidence.

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Figure 4.2 The author’s idea of the origins of nomadic pastoralism in Africa. The lines demonstrate direct influence, and the dotted lines indicate later inspiration.
In Africa, nomadic pastoralism appears to have originated in the Sahara region about 7000-8000 BP. Following this, it appears there has been a spread to East Africa due to climatic changes c. 3000-4000 years later; this might have been a spread as well as a new point of origin. Finally, pastoralism can be seen in southern Africa from c. 2000 BP.

From the above it appears that nomadic pastoralism cannot be said to have had one precise origin, perhaps it has had many origins, in many places, at different times. Hence, the different theories concerning the origins of pastoralism may all be correct, but at different places. Moreover, there can be different origins at the same place, but at different times.

If Cribb (1991) is right when he argues that nomadic pastoralism is an unstable and fluctuating mode of livelihood involving a heavy commitment to the herd, then perhaps it would be better to study those sets of conditions under which nomadic pastoralism emerges and declines than to study the possible origins.
Chapter 5

NOMADIC PASTORAL ADAPTATIONS IN THE PAST

Nomadic pastoral societies cannot be understood without reference to their historical development.

This chapter presents an analysis of historical events through which factors influencing pastoralists’ cultural and behavioural adaptation can be analysed. Moreover, considering the new paradigm (with its concern for time) it seems appropriate to offer a chronological study. The previous chapter outlined the origins and spread of the nomadic pastoral system in Africa c. 10000-2000 BP. Hence, it focused on the archaeological perspective, whereas this chapter will ‘jump in time’ and look at the system in an historical perspective. The historical analysis emphasises the impact of colonialism because this is the most important event in recent times; also, there is not much information on the nomadic pastoral societies prior to the colonial period. This means that this chapter has to be based on cases which are very different in their approach, time frame, reliability, etc., moreover it was impossible to find one tribe that could be studied for the whole period or sufficient case studies to cover vast variations in pastoral systems. Thus, it is difficult to generalise on the basis of the material. In order to get around this problem each section includes some ideas of how one could imagine the customary pastoral system to be, as well as some examples of how it has been.

This chapter is the first to focus on the three main themes mentioned in chapter 1 and 3. Thus, there are three sections: first the availability and use of range and water are debated, then tenure systems are outlined, and finally exchange and market relations are discussed. The division into these three themes might not always seem appropriate as they obviously are interrelated. Therefore some things may be repeated in the different sections.

The colonial powers evidently influenced the life of nomadic pastoralists, but especially the exchange and market relations were altered due to the colonial presence. Therefore, the section on exchange and market relations is the most extensive and most detailed as far as the colonial administration is concerned.

5.1 Availability and use of range and water

As mentioned, it is difficult to separate the different aspects of the nomadic pastoral society. The division between availability and use of range and water on the one hand, and tenure systems on the other, appears especially difficult when discussing the past (with emphasis on the impact of colonialism). Hence, part of the discussion in this section is relevant for the subsequent section. In chapter 3 it was mentioned that improvement of rangelands and drilling of boreholes were issues relevant to the discussion of availability of range and water. The majority of these improvements are

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1 Barfield 1993 p.17.
relatively recent\textsuperscript{2}, thus they are all discussed in the next chapter to make the discussion of improvements more comprehensive. This section is divided into two parts: the first includes a discussion of pre-colonial aspects of availability and use of range and water; the second concerns the impact of colonialism.

5.1.1 Pre-colonial aspects of availability and use of range and water

The literature discussing the availability and use of range and water prior to the colonial era is limited. One reason could be that the resources were not in short supply as the population density was lower and the availability and use of range and water, therefore, were not important issues. Likewise, the number of agriculturalists using rangelands for agricultural purposes has probably been limited as long as more favourable agricultural land was available. Also, it is claimed that pastoral population growth was limited due to birth control (Pedersen 1985), and due to the control of the herd size by the harsh climate (Dahl & Hjort 1976). According to Gallais (1975), the pastoralists of Mali had lower fertility rates compared to e.g. agriculturalists; similar findings have been reported from Turkana and been explained through the diet (Tostesen 1980).

Nevertheless, the access to water and dry-season pasture was essential for the survival of the herd and thus the pastoralists. While the resources might have been abundant in normal times, the pressure has possibly been high in drought periods. Consequently, competition and fights over these resources have been commonplace for centuries. Competition has not only concerned the mere availability and use of range and water, but also access to the best of these resources (Waller & Sobania 1994). When fights over range and water became too severe, migrations to other areas probably became commonplace. As long as rangeland was abundant and access to water could be ensured in the dry season migration to new areas could occur without leading to new fights. But it appears that with an increasing number of people, it became harder to take over new land. At first competition for rangeland and water was probably between different pastoral groups, later agriculturalists also began to compete for resources (Saltzman 1981). During the last 150 years encroachment by agriculturalists has caused the pastoral area to decline (Thébaud 1995), and thus competition for rangeland and water to increase. The increased pressure on rangeland and water resources also resulted in changed arrangements concerning tenure as outlined in the next section.

Different ways of ensuring the availability of range and water and using these resources are represented in the following examples:

The access to range and water have been ensured by migrating to new areas. This can be revealed by the fact that most nomadic pastoral groups have come from another place than they occupy now. For instance the Turkana people came into the Turkana area during the second half of the 18th century. Here they were able to displace other groups, because they avoided the great rinderpest of the 1880s, and hence the population could grow and needed more land (Gulliver 1955). Also, the history of many pastoral groups includes aspects of migrating to new areas. According to Maasai oral tradition they originated near lake Turkana and moved south (Talle 1988), and according to a popular Fulani tradition of origin they descend from the Arabs\textsuperscript{3} (Adamu 1986). Migrations have

\textsuperscript{2} One exception being the boreholes of Senegal.

\textsuperscript{3} However, this is a myth and might not be true.
Also taken place more recently, for instance the Fulani occupying the grasslands at the
border between Nigeria and Cameroon today have come from the North within the last
two centuries (Frantz 1986). Thus, nomadic pastoralists are used to moving to new
grazing areas either when they are forced to do so, or if the new areas are better, for
instance, providing better access to watering points. As described by Talle:

“...In search of pasture and water for their growing herds, the pastoralists came in
waves which branched off, separated or amalgamated.”
(Talle 1988 p.22)

Raiding has also been a means of obtaining more land (Loiske 1990). One pastoralist
group could make an area unstable by constantly raiding the other groups when they
were in that area, for instance near a watering point. In the end the other pastoralists
would give up using the area and the raiders could take over the land (Oba 1992).

As far as the use of the land is concerned, some pastoralist groups included some kind
of agriculture. However, among the Tuaregs\(^4\) agriculture was not considered proper work
and thus they did not pursue it themselves. The traditional Tuareg society was by no
means, as some other nomadic pastoral societies (e.g. the Nuer (Evans-Pritchard 1940)),
an egalitarian one. It consisted of noble Tuareg who were camel breeders, vassal
Tuaregs who were goat breeders, and finally of Negroid slaves who did agricultural
work in the oases (Nicolaissen 1964). Slaves were important to the Tuareg economy
because they produced agricultural products for their owners (Nicolaissen 1963a). Also,
free agriculturalists immigrated to the oases and valleys to cultivate. The immigration
was initiated by the Tuareg who owned the land; hence, all the agriculturalists had to
cultivate according to contracts with the Tuareg (Nicolaissen 1964).

The Maasai\(^5\) provide a few examples of how the availability of range and water could
be ensured. They divided their territories into sections that contained both highland
dry season reserves and lowland wet season pastures (which were often rich in essential
minerals), and ensured access to reliable watering possibilities within both areas.
Moreover, in this way there was an implicit key to the use of the resources (Waller &
Sobania 1994). Between 1830 and 1880 the Maasai expanded their territory by
depriving other pastoralists of their area. This was done by systematically gaining
control over the strategic areas, for instance a watering point or dry season key
resources. The pastoralists of the area were marginalised and in the end forced out of
pastoralism (Waller & Sobania 1994).

5.1.2 The impact of colonialism on the availability and use of range and water
Colonialism changed the availability and use of range and water in two main ways: it
increased the pressure on the resources by increasing the pastoralists’ area, and it
changed the land use in some areas to cultivation. Moreover, the population could grow
in a hitherto unknown manner because the health of both humans and livestock was

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\(^4\) The Tuareg have been investigated by a number of scientists, and the majority of accounts of nomadic
pastoralism in pre-colonial times in West Africa concern Tuareg groups. Thus, many of the West African
cases in this chapter concern Tuareg groups.

\(^5\) Most accounts of ancient East Africa pastoralists concern the Maa-speaking people of whom the Maasai
are the most famous. Thus, many of the East African cases in this chapter concern the Maasai.
improved\(^6\) (Gallais 1975). In addition, in times of stress pastoralists could seek occupation outside the pastoral sector (Sobania 1991). These changes are illustrated by the following.

The impact of colonialism on the nomads of the Sahara was profound. The tribal grazing areas were brought under government control, and when the powerful tribes fought back, they lost. The colonial administration encouraged agriculturalists to settle in the best of the pastoralist areas, hence restricting the pastoralists’ possibilities to cope with drought. Later, the delineation of national boundaries restricted the traditional migration routes, the taxation by the governments took over the ‘brotherhood taxes’, and later still, trucks took over the caravan transport through the Sahara (English 1973). Raiding had been commonplace in the Tuareg society, where it was an important part of the noble Tuareg economy. Also, the noble Tuareg either lent their camels to the vassals for raiding or united in raiding themselves. The colonial administration abolished Tuareg warfare; thus, the noble class of raiders became functionless. Instead, they used their camels to expand caravan trading (Nicolaisen 1963a). Trade with slaves and slavery itself were forbidden, but slavery persisted for a long time with the consent of the administration (Nicolaisen 1965).

To sum up, the nomadic pastoralists of the Sahara were ‘constricted in space, reduced in prestige, lowered in income, and led by government appointed chieftains’ (English 1973 p.163).

In Nigeria, Hausa agriculturalists arrived in the area in the 1880s and started to cultivate. However, it was not until the British tried to stimulate production and trade by developing cash crop cultivation (mainly of groundnuts) that the Hausa encroached on pastoralist areas. From the 1930s cultivation developed fast and new land was taken into use. These new areas were mainly grazing areas used by pastoralists (Kerven 1992). This had severe effects on the pastoralists who were forced to move their migration patterns further north and thus not only be cut off from the crucial high-productivity patches, but also from dry season watering points in the South, and thereby markets in the agricultural zone (Gefu 1992).

In Kenya the pastoralists encountered the colonial power earlier than in the Sahara, and the impact was just as profound. Land was taken over by Europeans - often the dry season key resources - taxes were introduced, migration patterns obstructed, sedentarisation projects introduced, etc. (Waller & Sobania 1994). According to Talle (1988) the agricultural encroachment on Maasai grazing resources began at the start of the colonial period. The agricultural work was usually carried out by Kikuyu employees, as most Maasai regarded agricultural work as degrading to their pastoral image. In the 1930s, European ranchers in Kenya wanted to encroach on the Samburu grazing areas (which were officially recognised), and wanted veterinary interventions to prevent cattle diseases spreading. However, veterinary officers mentioned that vaccinations would lead to a greater number of cattle surviving, and thus, a higher stocking density. This was problematic as the Samburu area was considered overgrazed already. Consequently, more marketing channels were suggested. Kerven describes:

\(^6\) It should be mentioned that most pastoral groups had extensive indigenous veterinary also called ethnoveterinary techniques (Farah et al. 1996).
“What began as a political agenda, to forestall African land claims against competing European interests, has evolved into an ecological agenda to protect the land for competing vegetation interests.”
(Kerven 1992 p.14)

After World War II Kenya, was considered overstocked. The Maasai territory had been reduced by almost 90% including most of the best dry season grazing land; this, combined with the lack of secure markets had caused higher stocking densities than desired by the pastoralists and the British administration. Different grazing schemes were introduced to cope with the ‘overgrazing’, but they all failed. After independence the so-called overstocking problem in Kenya was to be resolved through a change of tenure systems (Kerven 1992).

Generally the major change in the availability and use of range and water has been the increased pressure on the resources caused by population growth. Prior to the colonial period, the changes were small in scale, but fights and competition were commonplace. Colonialism accentuated the pressure on land and water; in East Africa the encroachment on pastoral areas by European ranchers has probably been the most important factor, while it has been the encroachment by agriculturalists cultivating cash crops in West Africa. For the nomadic pastoralists the adaptation to the colonial powers’ changes in the availability and use of range and water was sometimes a question of mere acceptance.

5.2 Tenure systems

When discussing tenure7 regimes it is worth noticing that tenure goes beyond the status of the land itself. Most customary tenure regimes include regulations on access to water, herbaceous and woody vegetation, minerals and wild fauna and flora (Thébaud 1995). Also tenure arrangements can determine how long one can stay in a certain area, who is allowed to use the various resources, which activities can there be carried out there, etc. As far as the origins of tenure systems are concerned Harrison (1991) claims that rules for the use of land were developed when man moved from the hunter and collector stage to pastoralism8. Rules were made ‘to harmonise both social relations between competing groups, and to ensure the continued viability of the ecological niche’ (Harrison 1991 p.49). Hence, it is assumed that tenure systems have existed throughout the history of pastoralism and have changed/intensified according to increasing population pressure and thus pressure on resources. Customary tenure systems vary from area to area and from group to group. As explained by Thébaud:

“Since environmental conditions and land use practices may vary considerably from one place to another, customary tenure is first of all striking in its diversity.”
(Thébaud 1995 p.4)

The apparently public nature of nomadic pastoral rangelands caused customary tenure regimes to be perceived as virtually non-existent within the old paradigm. However,

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7 Refer to chapter 1, footnote 5 for a definition of tenure.
8 The discussion of which development stage preceded pastoralism has been outlined in chapter 4 and will therefore not be dealt with here.
pastoral areas are usually subject to controlled access through individual usufruct rights or ownership of certain resources. According to Behnke (1994) tenure systems would build on exchange of access rights, be mutually advantageous, and work on a voluntary basis. When resources became scarce, the pastoralists would regulate the use by tightening up the tenure regimes and use political and military power. This is illustrated in the following.

In East Africa good relations between nomadic pastoral groups meant reciprocity in access to resources during times of stress. Still, the group arriving in an area where they did not traditionally use resources had to follow the ‘host’ group’s rules (Oba 1992).

In the Sahel priority usage rights exist. These have probably been developed according to the increasing pressure on resources. Priority usage rights are usually not exclusive, but leave control over a watering point to a very restricted group or even a family. Access can be offered to passing herds according to rules regulating the use of the surrounding pasture (Thébaud 1995). In northern Senegal, access to pastures has been open - the regulation has mainly been based on conventions of “good behaviour”. For instance it was considered ‘bad manners’ to camp close to other pastoralists and close to settled communities (Juul 1994).

Due to the lack of reliable accounts of the customary tenure systems of the Sahel the following is mainly based on ‘common sense’. It appears that in the Sahel tenure systems have been less restrictive than in East Africa. One reason could be that the long-distance migration patterns of the Sahel required flexible tenure arrangements. In the North water has been the limiting factor for utilisation of pastures (except in the wet season), therefore tenure systems here have emphasised usufruct rights to watering points. This is confirmed by Thébaud (1995), who states that access to watering points has long been subject to regulation. In the South water has not usually been a constraint, but with the increased cultivation grazing of the herd has involved access to agricultural areas. Thus, tenure systems in the South are likely to have started to include grazing rights around villages, access to stubble fields etc. This has probably consolidated exchange and trade relations.

Among the pastoral Maasai exploitation rights to land existed. The usufruct rights were acquired ‘by virtue of territorial affiliation’ (Talle 1988 p.31). This means that the Maasai territory was divided into sections within which each Maasai group was free to exploit pasture and water resources. The borders of the sections were founded by customary use, but they were not absolute; thus in times of drought and stress people could negotiate access to pasture and water across sections. During the colonial period these borders were formally decided and fixed (Talle 1988). However, often the British administration in Kenya did not recognise grazing rights to the land, especially if the area appeared unexploited (which key resources often do). In this case the borders were made according to the Europeans’ wishes for good farming and ranching areas. Even these borders were not recognised by the administration; thus if a European wanted to establish a new ranch or extend an existing one by encroaching on pastoral areas this was often allowed (Kerven 1992).

A further increase in the tenure system was experienced by the Turkana - a unique example of tenure contrary to the previous examples. The Turkana area was subdivided by the different Turkana tribes (McCabe 1990). Within the tribal area only the local tribe was allowed to utilise the resources. However, the different households had
friendship relations outside the tribe. In case of drought or disease within the tribal area the whole tribe might be suffering and could not migrate to other tribal areas. Depending on the size of the livestock loss, the individual households would receive new animals via their friendship relations. This meant that drought-affected pastoralists had to stay within their tribal area, but were supplied with new animals acquired outside the area. This implied that pastoralists that were not affected by the drought, disease, etc., were not compelled to share their natural resources with those who were affected, but “only” had to share their surplus stock (McCabe 1990). One could argue that in cases of drought, it would be better if the pastoralists could migrate to new pastures and thus let the affected tribal area rest. Obviously, if the whole tribal area was not affected the households would move to the good part of the area, but if the whole area was affected the tribe had to stay within the tribal area and accept the substantial reduction in the herd size that drought or disease would cause. New stock was not supplied through the friendship relations unless the household was severely affected; hence, grazing pressure would therefore have declined and the tribal area would have had time to rest before restocking.

To have rights (usage, access, etc.) is not enough if these rights are not respected by competing groups and if the administration allows the rights to be neglected. The most common sanctions against violations of the tenure systems, prior to the colonial period, were raids and wars (Bernus 1990). As the colonial powers tried to stop raids and wars pastoralists were left with little possibility to ensure their resources (Oba 1992). The nomadic pastoralists of Niger are an example of this. Here the French administration divided the country into a zone nomade in the North and a zone sédentaire in the South where pastoralists and agriculturalists respectively had usage rights (Horowitz & Little 1987). Nomadic pastoralists were allowed into the ‘zone sédentaire’ after the harvest, and a complementary relationship between pastoralists and agriculturalists existed. However, when agriculturalists were allowed to encroach in the ‘zone nomade’, the complementary relationship changed to a competing relationship.

The impact of the colonial administration on pastoral tenure systems was mainly through national legislation imposed on the customary tenure regimes. In this context the general British and French tenure legislation is briefly mentioned. The British tenure legislation in Africa was based on ‘The Imperial Law’, which originally was developed for India and also applied to Australia (King 1994). The land was divided into three categories: crown land, freeholds and leaseholds (Hitchcock 1990). Land that could not be proven to have a rightful owner was recorded as crown land (belonging to the Queen). This included indigenous land (Sperling & Galaty 1990). However, in the beginning customary law was retained on the indigenous land (Thébaud 1995). Freehold was land which was bought and on which the owner had to pay tax. Leasehold was rented on a yearly basis (King 1994).

The French administration applied a system of national property and vacant ownerless property. If customary rights to the land could not be proven, which was very difficult, the land was included in the public estate (Thébaud 1995).

At first this did not influence the everyday life of the nomadic pastoralists, as long as they could wander as usual. However, in East Africa the establishment of private European ranches in pastoral areas imposed difficulties on their movement, and hence altered pastoral life.
It is hard to generalise about customary tenure systems. It appears that customary tenure systems of East Africa have been more restrictive than those of the Sahel, but it is appreciated that especially the regulation of the use of resources in the dry season or in drought situations is crucial. As water often is the limiting resource in the dry season, managing access to watering points became a favoured way of regulating and controlling the use of the pasture in the northern Sahel. In East Africa, tribal areas including a variety of resources were made, and each tribe had to stay more or less within these areas. Importantly, arrangements concerning drought situations also existed.

5.3 Exchange and market relations

Historical records show that pastoralists were not suddenly confronted with an external market. Nomadic pastoral groups have had various kinds of relations with the surrounding society, thus different types of exchange and market systems have existed throughout their history.

At the end of the 19th century pastoralists were still the centre of the regional networks of exchange. By 1950 this role had changed completely, and pastoralists were marginalised by a political system that favoured agricultural export. Moreover, investment in stock ousted other possibilities of accumulation (Waller & Sobania 1994). This section examines the conditions that have encouraged pastoral livestock exchange and marketing. First, some general points are made, and then the historical development of livestock exchange and trade in East and West Africa is discussed separately.

It has been argued that nomadic pastoralist economies based on subsistence production inherently encourage exchange or sale under certain conditions (Kerven 1992). This occurs when the exchange value of livestock or livestock products is greater than the consumption value (also called use value): in other words, when the ‘price’ is right. In this case, pastoralists have sought to exchange part of their livestock resource with something they needed or wanted more. The time when these conditions arise is mainly a function of external demand for livestock or livestock products, but is also a function of the supply of these items. This implies that even during the most difficult times such as drought, it is only worthwhile for pastoralists to exchange their livestock or livestock products when the exchange can provide more (food) than simply using (eating) the animal (Kerven 1992).

In chapter 3 it was mentioned that exchange and trade can take place in two situations: normal situations where trade or exchange is planned, and emergency situations (e.g. drought) where trade or exchange takes place without regarding the long-term consequences (e.g. higher exchange value later in the season/year). In the latter situation, pastoralists are often said to have be ‘perverse price-responsive’ indicating that exchange or trade in that situation was not ‘optimal’. Unless anything else is mentioned, the situation applying to the following is the normal situation. Anyhow, livestock prices and drought are probably the principal factors affecting livestock sales. Also, livestock disease is an important impetus for pastoralists to sell their stock. However, steady external demand for pastoral livestock often overrides the local supply/price fluctuations (Kerven 1992).
There is a positive relation between infrastructure and greater livestock marketing. Thus, a government can enhance or suppress livestock marketing by changing the infrastructure. In Nigeria, for instance, services were developed as a means of increasing the supply of stock to the market, whereas in Kenya, the government used livestock facilities to control and even block the livestock supply. It has been shown that market access in Niger has been the key factor in the changing relationship between supply and demand (Kerven 1992). This is possibly applicable to other places.

5.3.1 East Africa

The Maasai and the Samburu (of the present Kenya) are used to illustrate the East African case. The former group was profoundly affected by British colonial politics while the latter group met the administration later and experienced less severe consequences.

There are only a few pre-19th century records showing trade and exchange relations in East Africa. However, it is known that the Maasai have been involved in trade and exchange of livestock throughout recorded history. The trade of livestock by-products was principally in the hands of women. They exchanged ghee, milk, hides, and skins for grain, ochre, tobacco, etc. (Talle 1988). The Samburu traded hides and skins as well as animals at the market, and they had relations with agricultural areas where pastoral products were exchanged for millet, and later maize, beans, and potatoes (Kerven 1992). By 1880 both Arab caravan traders and Somali merchants were trading with the Samburu. At times of intertribal tension sometimes only women could pass safely through the tribal areas. Hence, women were seen conducting the trade caravans (Talle 1988).

The colonial British administration did not reach most of the pastoral areas in East Africa until the first decade of this century. Their prime goal was to control trade, thus ‘free trade’ was rarely permitted. A very important factor in understanding the colonial politics of the area is the establishment of European ranches. For instance, as soon as the European ranchers felt threatened by the pastoralists, because they were not price competitive, trade control was enforced by the British administration (Kerven 1992).

The Maasai were probably the pastoral group most deeply affected by the British. Their area was severely reduced, and the Maasai were taxed in 1907 as one of the first pastoral groups. During World War I (and World War II) livestock marketing was encouraged for a short while when the colonial administrators realised that the European ranchers could not meet the increasing demand for meat (Dahl 1979). When the military authorities paid for the stock it was in cash; hence, during the war a monetary economy was introduced in Maasailand and the use of cash continued after the war, even though the British imposed constraints on Maasai livestock marketing. Quarantines, for instance, restricted the quantity of livestock that could be legally marketed. This served as a means of price protection for the European ranchers who were not price competitive. These quarantines changed through the next decades depending on the demand for livestock. This meant that the Maasai did not have a reliable market where they could sell surplus livestock. The excuse for the quarantines was the outbreak of diseases in the pastoral areas (Kerven 1992). However, there were hardly any veterinary services offered to the Maasai, these were only for the European ranches. The
pastoralists’ traditional means of avoiding stock diseases: avoidance of infected areas, isolation, and burning, were reduced after the British arrived because the Europeans took over some of the vital grazing areas (Waller & Sobania 1994). The establishment of colonial veterinary services meant that the most serious cattle diseases were nearly eradicated in the 1930s from the European ranches, but not from the pastoralists’ herds (Kerven 1992).

Until the 1930s, the major British concerns for Samburu pastoralism were that their herds had to be large enough to supply the British administration’s personnel, and that the Samburu should be engaged in a cash economy to expand the commercial trade within the interior of the colony.

From the 1930s to the 1940s the ‘overstocking thesis’ played an important role in the colonial administration’s livestock marketing policy. The ‘overstocking’ problem had to be overcome through enforced livestock sales; thus, the administration considered marketing a means of dealing with constraints on land availability in the Samburu area (Kerven 1992). However, there was not much price incentive for the pastoralists to sell their stock on the official markets. Here the prices offered for livestock were different for the European ranchers and the pastoralists. The justification was that the production costs for Europeans were higher than for the pastoralists. The price difference was 50-100% depending on the grade of beef (Kerven 1992). On the illegal markets controlled by private traders the prices were better and hence those markets were used and existed throughout the colonial period (Dahl 1979).

It was a major problem for the pastoralists that the colonial taxes were often due in the dry season, for the pastoralists needed money when the animals were in poor condition and the prices low (Kerven 1992). Therefore, pastoralists often appeared to have had a ‘perverse supply-response’ such as they had during an emergency situation. This has probably enhanced the notion that pastoralists were conservative and reluctant to sell their stock (Hjort 1990b).

Another problem was that sales on the official markets were neither regular nor reliable. A large number of animals were therefore sold off the record, hence it is impossible to quantify the livestock actually marketed during the colonial period (Kerven 1992).

At Independence, the Samburu livestock marketing was integrated into the official marketing system as well as operating through private traders as had happened before the British arrival in the Samburu area. Throughout the colonial period, livestock marketing among the Maasai was encouraged or neglected, depending on what suited the administrators. The Maasai were often accused of being culturally resistant to selling their livestock. However, as pointed out by Kerven (1992 p.44) ‘the history of livestock sales among the Maasai... clearly demonstrates that the Maasai preferred to sell where they could obtain the best prices, and did sell whenever demand and prices were in their favour’.

5.3.2 West Africa

Pastoral Fulani groups of Nigeria and Niger are used to illustrate the West African case. The former country was under British administration while the latter country was under
French administration. The two colonial powers had quite different policies (and the British administration in Nigeria was quite different from the one in East Africa), and hence the consequences for the pastoralists were quite different.

There are many different Fulani groups in West Africa, not all of which are pastoralists. Those who are pastoralists, however, are usually nomadic cattle producers. The groups have different names, but will here be referred to as the Fulani of Niger or the Fulani of Nigeria.

In both Niger and Nigeria, livestock marketing was well established prior to the French and British conquest, and the Fulani paid tribute to various Emirs. There were extensive caravan trading routes from northern Nigeria running both north and south. However, restrictions were sometimes imposed on trade and travel due to warfare between the different emirs (Gefu 1992).

In what was to become Nigeria, the Fulani came under British administration after 1900. The history of British intervention in Nigeria is quite different from its history in Kenya. Foremost, the Governor was opposed to Europeans settling in Nigeria; he had been to both India and East Africa and did not approve of the changes European settlement had caused there. There was only one incident of Europeans being allowed to have a ranch. ‘African Ranches Ltd.’ existed from 1914-1923, did not have much success, and had no impact on the pastoral life in Nigeria in general (Kerven 1992). This means that the problem of European ranches competing with pastoralism never occurred.

In 1906 the British took over the tribute system, and customary grazing fees eventually became a tax assessed on herd size (Stenning 1959). However, the administration used little control or intervention in the existing livestock trade (Gefu 1992). In 1912, a programme was established which made Fulani chiefs responsible for tax collection, and tried to make them settle. Within a few years permanent Fulani settlements around the best wells and grazing areas were established (Stenning 1959). Attempts were made to require that the tax be paid in cash, but this was difficult until the cattle markets were paying satisfactory prices in cash. As the British accepted tax being paid in kind, the Fulani were not part of a monetary economy before the 1920s (Kerven 1992).

The British soon realised the importance of the caravan trade and imposed a caravan toll. However, the various taxes and tolls imposed by the British did not hamper the livestock trade, probably because it was followed by expansion of the infrastructure as well as veterinary programmes. In addition, the taxes were increased or decreased depending on the general economic situation (Kerven 1992). Thus, the British livestock policy in Nigeria was based on the fact that the pastoral economy was very important for the country - it was important to sustain the pastoral sector as it provided a good basis for taxation (Stenning 1959).

After the British arrival, the volume of livestock trade increased. First it was because of the need for meat for the British administration; later agriculturalists in the South were able to buy more meat because they gained money by selling cash crops (Gefu 1992). Also, during the first World War, livestock trade increased. However, the single most important factor for the livestock trade was the opening of the rail line between Lagos and Kano in 1911 (Kerven 1992). Although sale of cattle was important during the
colonial period, the production system was characterised as a herd-owning and milk-selling enterprise (Stenning 1959). Estimates show that the cash income from the annual sale of milk was about four times that of meat. The British administration noticed the high commercial value of milk and established several dairies (Fricke 1993). The business thrived: Fulani women received up to seven times more for their milk at the dairy than at the local markets, and the dairy products were easily sold either within the Nigerian market or exported to Britain (Kerven 1992). As far as the livestock sales were concerned, it is believed that the number of cattle marketed was equal to the potential number available for marketing considering the productivity and hence off-take rate of the herd (Kerven 1992). The tendency of the Nigerian Fulani to sell off unproductive stock helped keep a high number of cattle available for the market (Fricke 1993).

The study of Nigeria illustrates a number of key points: the close interaction between the pastoral economy and the national economy; it also illustrates how a government can enhance and encourage livestock marketing; and it illustrates how the Fulani managed to adapt the new situations created by the strong demand-driven type of marketing system of Nigeria.

The history of livestock marketing in Niger is quite different from that of Nigeria, even though the pre-colonial history is similar - except that what was to become Niger was more arid and thus more influenced by pastoralists than Nigeria. Also, there were more different pastoral groups among which the Tuareg played an important role. For centuries prior to colonialism, Niger was the core of trans-Saharan trade. Most of the transport of goods was carried out by camels that were owned by the Tuareg and perhaps hired out (Adamu 1986). Niger came under French administration as mentioned. The first French expeditions arrived in the area in 1896. In the first decades the French systematically undermined the Tuareg economy while the Fulani generally had managed to avoid colonial interference. This lead to a nation-wide Tuareg revolt against the French in 1916 which had a profound influence on the pastoral sector in Niger in the following decades. First, it had the consequence that the trans-Saharan trade to the North was disrupted because the Tuareg left Niger. After the revolt, the Fulani took advantage of the pastures in the North that had been Tuareg-held land, and of the relative peace created by the French occupation. They changed their migration patterns to include a larger area and new directions. Kerven (1992) concludes:

“This process was spontaneous, adaptive, and ultimately very large in scale...”
(Kerven 1992 p.110)

From 1900-1930 the French applied a number of tax systems. In the beginning the pastoralists were able to avoid taxation by migrating at the right time, but tax on agriculturalists meant that these expanded their area, creating pressure on the pastoralists. Taxation of the pastoralists came under control when government officials forced the pastoralists to the market where the officials sold off the best animals and kept the revenue as a compensation for unpaid taxes in the past. Direct taxation of the caravan trade caused what was left of it to decline. Market taxes where the livestock traders were subject to taxation per head sold meant that the markets were moved to Nigeria. Some of the markets there extended their catchment area to a radius of 150 km.
Another reason for the markets moving to Nigeria was the underdeveloped infrastructure in Niger\(^9\).

One of the main problems concerning livestock sales in Niger was that the peak in the demand, and hence the best prices, occurred at a time where the pastoralists had no access to the market, because they were herding in remote areas (in the North) without markets (Kerven 1992). Thus, long-distance nomadic pastoralism was incompatible with optimal live animal sales (due to the lack of markets and/or proper infrastructure to bring livestock to the markets). Consequently, the pastoral Fulani of Niger have often been described as having a non-market orientation towards live animal sales and a market orientation towards sales of dairy products. The primary influence on live animal sales during the colonial period was the limitation imposed by the annual long-distance (north-south) migration cycle.

**5.4 Discussion and summary**

There have been changes in the availability and use of range and water, the tenure systems and the exchange and market relations in pre-colonial times, but these changes appear to have had a minor impact compared to the impact of colonialism. Thus, the pre-colonial period has been one of small changes to which the pastoralists have adapted.

It appears that the population growth in the arid and semi-arid areas was low due to environmental fluctuations which restricted herd growth; with a limited number of other means of obtaining a livelihood, pastoralists were very dependent on the herd. At first the nomadic pastoralists could ensure availability and use of range and water by migrating when the pressure on the resources was too large. With the increasing number of people both nomadic pastoralists and agriculturalists, who often encroached on the best pastures, new tenure systems were established.

The customary tenure systems are very variable, but can be said to encompass a diversity of rights (usufruct and access) over the important resources of the nomadic pastoral utilisation system: wet season pasture, dry season watering points, contracts of exchange with agriculturalists, access to market areas and key resources. The regulation of these was usually adapted to the scarcity of the resource.

Different exchange and market relations have existed since records began. The main exchange relation was between pastoralists and agriculturalists, but also trade with merchants was common, although this is more recent than simple food barter. It appears that it was more common for local nomadic pastoralists to pursue trade in West than in East Africa\(^10\). Some of the differences between nomadic pastoral groups of East and West Africa are shown in table 5.1. However, this should not be interpreted as an

\(^9\) In order to understand the livestock market development one also has to consider the relationship between the English Pound and the French Franc, however this is beyond the scope of the thesis.

\(^10\) This has recently been questioned by Mung’ong’o (1995) who claims that the number of indigenous people engaged in caravan trade in East Africa increased substantially in the last century. However, it appears that at least some of these traders were agriculturalists and not pastoralists.
implicit classification into East and West African pastoral systems which can be used later.

<table>
<thead>
<tr>
<th>West Africa</th>
<th>East Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>• long distance migrations</td>
<td>• short migration routes</td>
</tr>
<tr>
<td>• daily contact with agriculturalists part of the year</td>
<td>• no daily contact with agriculture and thus no exchange with dairy products</td>
</tr>
<tr>
<td>• exchange of dairy ↔ cereal</td>
<td>• exchange of live animals ↔ cereal</td>
</tr>
<tr>
<td>• slaves or lower casts cultivating (oases) for the pastoralists</td>
<td>• no slavery, often pastoralists had cultivated plots</td>
</tr>
<tr>
<td>• long tradition for local nomadic pastoralists to control (caravan) trading</td>
<td>• (caravan) trading not traditionally controlled by local nomadic pastoralists</td>
</tr>
</tbody>
</table>

Table 5.1 Some differences in the nomadic pastoral utilisation system in East and West Africa.

It is clear that colonialism had a profound impact, and was perhaps the most important single event in the history of pastoralism in Africa. The most affected area was exchange and trade relations, although tenure systems and delineation of borders were also influenced by the ideas of the administrators. After the arrival of the colonial powers the population grew in a hitherto unknown manner because the health of both humans and livestock improved. Moreover, colonialism increased the possibilities of earning a living outside the traditional spheres. Hence, the environmental constraints on population growth decreased.

Most colonial administrators imposed tax payments on the pastoralists’ herds quite early after their arrival. Not long afterwards the tax had to be paid in cash. As cash was only available through sale of livestock, the payment of tax to the colonial administrators meant that pastoralists became involved in a monetary trading system very early in this century.

In West Africa, the colonial powers hampered the trans-Saharan caravan trade, abolished slavery (with minor effects), and altered the military status of the pastoralists. In both East and West Africa, attempts at making nomadic pastoralists sedentary were started in the colonial period. The way the administration dealt with all of these issues had severe consequences for the adaptive capacity the nomadic pastoral system was left with.
Chapter 6

PRESENT ADAPTATIONS OF NOMADIC PASTORALISM

At the same time, people’s adaptations change as conditions alter,
so that a snapshot of pastoral life today is but one
in a sequence of moving images.¹

The previous chapter showed the nomadic pastoralists’ adaptation to changes in the past, especially to the impact of colonialism. The purpose of this chapter is to discuss the post-colonial period. Hence, the scope is present or post-colonial adaptations of the nomadic pastoral utilisation system.

According to Waller & Sobania (1994) drought and development have been equally devastating to nomadic pastoralism in the post-colonial period; therefore emphasis is given to the effects of drought and development. Development can be understood in a number of ways. In the present context two understandings are chosen. The first is development as ‘natural development’ or ‘indirect development’, i.e. the changes in society in general that inevitably influence nomadic pastoral societies such as commercialisation. This is called indirect development, because it usually is very difficult for pastoralists to fight this kind of development. The other meaning of development is ‘development projects’ or ‘direct development’, i.e. initiatives targeted for nomadic pastoralists such as the creation of watering points. This kind of development is called direct development, because it is a conscious action involving the pastoral societies directly. While direct development is supposed to have positive consequences for the target, indirect development can be both good and bad. Direct development is defined so ‘as to include the conscious pursuit of certain actions with the purpose to increase welfare’ (Sandford 1983 p.4). The question is how welfare is defined and by whom. In the following the terminology ‘direct’ and ‘indirect development’ is used. However, it should be kept in mind that direct development can be indirect for the population involved and vice versa. Finally, it is worth mentioning that both direct and indirect developments are exogene types of development. Endogene development is not considered important in this context, because most endogene changes are supposed to be a result of exogene influences. Population growth, for instance, is an endogene change, but it can be argued that it is the result of exogene development: improved human and livestock health, alternative income activities, etc., which means that more people can survive.

The extension of the market economy or commercialisation is considered the most important ‘indirect development’ in recent times; commercialisation will therefore be discussed in detail later. As far as ‘direct development’ is concerned, development projects based on the old paradigm will be reviewed in this chapter, and projects based on the new paradigm are analysed in the next chapter. Of course projects cannot be said to be based solely on one paradigm, but the division is attempted to detect the changes in development approaches during the last decades. For instance, in the 1960s and 1970s millions of dollars were spent on range development projects (direct development) (Sandford 1995). After the failure of these became apparent, there was a

¹ Toulmin 1995 p.95.
marked reluctance to embark on these areas in the 1980s (Behnke 1994). Many of the remaining projects tried to make unpredictable environments more predictable; thus, only recently scientists have come to realise that ‘crises’ are normal in drylands (Scoones 1995).

In the literature of the 1970s and to some extent the 1980s drought appears to be the most important issue when discussing nomadic pastoralists. According to the new paradigm drought is an integral part of the nomadic pastoral system in arid and semi-arid areas, whereas drought was regarded as an external factor within the old paradigm. When drought is considered an external factor, drought strategies are not understood in the right context; the herd size appears far too big, opportunism seems like over-exploitation. Droughts have been common to nomadic pastoralists living in uncertain environments, but the ‘traditional’² ways of dealing with droughts have been altered due to the impact of colonialism and the independent nation states (Bovin 1990). Drought is considered the most challenging aspect of the pastoral ‘cycle’. Therefore it is fruitful to investigate the changes in drought strategies that indirect and direct developments have caused.

This chapter focus on the three main themes mentioned in chapter 1, 3 and 5. Hence, there are three sections; first the availability and use of range and water are debated, then tenure systems are outlined, and finally exchange and market relations are discussed. In each subsection it is discussed how the development has changed the pastoralists’ ability to cope with drought.

6.1 Availability and use of range and water

Often changes in availability and use of range and water have been part of programmes meant to develop the pastoral sector (direct development). The establishment of new water supplies is, for instance, very popular among development agencies, as it was during the colonial period (Sandford 1983). In the following it is discussed how the improvement of rangelands and establishment of water points have changed the availability and use of resources, but first, changes in the availability and use of range and water are discussed in relation to indirect development.

6.1.1 The effects of indirect development

There are three main effects of indirect development: the encroachment by agriculturalists on pastoral areas and especially key resources; the administrative favouring of agriculturalists; and finally the enforcement of state boundaries. It should be noted that these factors are interrelated, and that they are connected to tenure regulations.

The pressure from agriculturalists is evident in most African countries and the number of obstacles for pastoralists is great (Thébaud et al. 1995):

² The term traditional is difficult to use, because it implies a steady state. This is not appropriate in the present context, in which it is claimed that nomadic pastoralism has been constantly adapting to changes in the natural environment and to changes imposed by the surrounding society.
 Present adaptations of nomadic pastoralism

- Extension of cultivated areas can cause a decrease in dry season pastures for the pastoralists, and when agriculturalists keep stock themselves pastoralists have to fight an uneven battle for the reduced pastures and the stubble fields\(^3\).
- In many areas, farmers’ livestock has encroached on traditional pastoral key resources, such as riversides.
- In other areas, cultivation has hindered migration, hence making it impossible for pastoralists to reach the remaining key resources.
- Farmers use income to invest in livestock and then send their stock to pastoral areas which increases pressure on resources.
- Reduced fallow and hence more cultivated land leaves a smaller area available for grazing by pastoralists’ herds. This is probably not very common in the Sahel, as the agricultural systems there base their nutrient supply on an infield-outfield system rather than on a fallow system.

‘Overstocking’ is one of the common notions in the discussion of pastoralist behaviour\(^4\). However, increased grazing pressure is frequently a result of cultivation of rangelands by non-pastoralists. Usually agriculturalists encroach on the high-productivity areas of pastoral land, consequently making rangeland management difficult for the herder. From a pastoralist point of view the land can be used more efficiently if the cultivated areas are confined to one area instead of to small pockets of cultivated land scattered around the range (Sandford 1983). However, cultivation of pockets is common as the key resources are often scattered around the range.

In most African countries there has been a favouring of the agricultural population (Horowitz & Little 1987) which has led to a marginalisation of the pastoral population. During the past decades this marginalisation has increased alongside the problems of the droughts in the 1970s and 1980s (Bovin & Manger 1990). The favouring of agriculturalists has often made it possible for them to improve their systems, for instance by using animal traction or by investing in livestock as a means of risk spreading (Ramisch 1996). In Niger the use of animal traction means that the agriculturalists (the Hausa) keep stock themselves and have become reluctant to allow the pastoralists to use the stubble fields for grazing. Hogg (1985) claims that the political bias makes pastoralists turn towards agriculture in East Africa. For rich pastoralists, cultivation is an issue of investment, while cultivation for poor pastoralists is a matter of survival. Among the specific reasons for this change can be mentioned the facts that the agricultural encroachment makes it harder to subsist as a pastoralist, and that relatively better prices on agricultural products compared to pastoral products. The study of Hogg (1985) confirms Barth’s (1986) findings that agriculture and sedentarisation attract rich pastoralists, while poor pastoralists are forced into a similar change.

The inclusion of nomadic pastoral societies within the borders of nation states has imposed profound constraints on the pastoralists’ freedom of movement. Oba states:

“Fixed borders are alien to the pastoral mode of land use...”

(Oba 1992 p.10)

\(^3\) That agriculturalists acquire livestock might be interpreted as a new ethnic group becoming agro-pastoralists, this is discussed in chapter 7.

\(^4\) Refer to the appendix 2 for a discussion of ‘overstocking’ and ‘degradation’.
The restriction of herds to smaller territories forces the nomadic pastoralists to stay in one area for longer periods of time, hence resulting in heavy grazing of that area (Solbrig 1993). The creation of state borders that the pastoralists are not allowed to cross is especially a colonial phenomenon. Independence meant less control and even the opening of some of the borders (Oba 1992). However, there are examples showing that the borders caused harm to the inter-tribal systems of reciprocal access to resources, and that these systems have been very hard to re-establish (Hjort 1990). Moreover, war or war-like situations between bordering nation states hamper the free movement of pastoralists, examples of this have been seen in the western Sahara (Arkell 1991).

6.1.2 The effects of direct development

The most common direct developments affecting the availability and use of range and water are rangeland improvement and the establishment of watering points. For the herder, the use of range and the use of water are interrelated, because he needs both within reach of the herd. Nevertheless the developments are often separated. Watering points are established in areas where the range resources are believed to be under-exploited, because of the lack of water. Rangeland improvement occurs in areas where resources are believed to be insufficient or of low quality.

RANGELAND IMPROVEMENT
Improvement of the range can either have vegetation or stocking density as the point of departure. Vegetation can be improved either by increasing the amount of available water for the plant (thereby decreasing the run-off), by increasing the amount of nutrients (mainly phosphor in the Sahel), or by altering the plant composition (more palatable species and/or n-fixing species). These methods have been applied in the USA and Australia, but are usually too expensive for African purposes (King 1994). Thus, most attempts at improving the African rangelands have to do with changes in the stocking density.

Rotation is one of these attempts; it has been used in Zimbabwe (Cousins 1993) and Botswana (Hitchcock 1990) for instance. Rotation changes the impact of livestock on the vegetation by moving the stock around according to a pattern. Rotation can be defined as the altering of ‘timing, length, and succession of use by livestock of a particular piece of land’ (Sandford 1983 p.102). According to this definition, one can argue that nomadic pastoralists always use rotation as part of their strategy. The definition does not indicate why rotation is carried out, i.e. whether it is in order to increase the productivity of the vegetation or the productivity of the livestock. Range scientists emphasise the effect of rotation on the vegetation, whereas pastoralists are concerned about the effect on their livestock. However, there is a difference between rotation carried out to improve the status and productivity of the vegetation and rotation carried out by nomadic pastoralists who place the emphasis on the status and productivity of the livestock (although, obviously, the latter depends on the former). The latter coincides with the nomadic pastoral movement of livestock and is therefore called movement of livestock. Hence, rotation only refers to the movement of livestock carried out with the sole purpose of enhancing the productivity of the vegetation. Rotation per se is very seldom used by nomadic pastoralists, because it does not work. Even if some increase in overall primary productivity (pastures) could be achieved by
rotation this would most likely be offset by the losses in secondary productivity (livestock) caused by the constraints imposed on the pastoralists, and hence their ability to search out and bring their livestock to the pockets of vegetation and minerals that they need, when they need them. The failure of rotation is partly due to the fact that rotation has been developed in the USA and Australia where livestock is not generally closely herded (Sandford 1983).

Already in the colonial period various grazing schemes using different (low) stocking densities were established and these continued to be used in the post-colonial period (Oba 1994). Nevertheless, there are hardly any grazing schemes today, because experience of them has not proved fruitful. Some communal grazing systems do control livestock numbers, others do not. That some do not control livestock numbers may not so much reveal an inherent institutional capacity as a lack of good reason to carry out control (Sandford 1983).

Many of the grazing schemes carried out some decades ago included a reduction in the number of livestock. With herd and family being, what Widstrand (1975) calls mutually defining concepts, a reduction in the herd size appeared like an attempt to reduce the family size. Today reduction in herd size is seldom part of the agenda, but development programmes are often based on the initial herd size of a group/population. Because wealth and poverty often are ephemeral conditions in pastoral societies, development can hence “freeze” the status of pastoral groups in a way uncommon to pastoral societies (Sandford 1983).

ESTABLISHMENT OF WATERING POINTS
The development of pastoral water supplies is closely related to rangeland management, because access to water is a key factor in access to pasture (Sandford 1983). Areas that are inaccessible for livestock due to lack of water can be utilised after the establishment of a watering point. Hence, the reason for establishing watering points is generally to increase the productivity of the rangelands. More watering points can also increase livestock productivity, because the herd has to spend less time and energy walking for water. Also, frequent watering tends to increase milk yields and live-weight gain, if sufficient feed is available (Sandford 1983). Sutter (1987) claims that the establishment of watering points means that a lower labour input is needed, because the herd can more or less stay in the vicinity of the watering point. Estimates of the size of an area accessible from a permanent watering point are often absolute, not considering the time of the year, the harshness of the season, and the class of the stock involved. If these factors are taken into consideration, the size of the area supplied by a watering point appears elastic; hence the extent of the pastures varies (Sandford 1983).

The type of watering supply, for instance a borehole, a dam or a piped supply, is to some extent determined by the physical characteristics of the area. Each type of supply imposes a particular pattern of organisation and management. For instance, dependency on boreholes reduces uncertainty from climatic causes, but increases uncertainty from mechanical and social causes. Moreover, the construction of large water supplies, such as boreholes and dams, involves considerable economies of scale, meaning that it is cheaper to establish one big supply than two smaller supplies. However, two smaller supplies established in different areas will often provide the most appropriate use of the pastures and be more convenient for the pastoralists. However, watering points are not
only established to ensure appropriate range use; they often serve as a means of buying political support. This means that usufruct rights to a watering point can be given to a larger group of pastoralists that the point has been made for. Hence, there is a risk of crowding and over-exploitation (Sandford 1983).

In order to increase the production of pastoral products the French administration established mechanised boreholes in the central Ferlo in Senegal in the 1950s (Sutter 1987). This meant that grazing resources, which it only had been possible to use in the wet season, now could be used year-round (Thébaud et al. 1995). It has therefore been termed ‘an enlargement from within’ of the pastoral area (Juul in press). It had the consequence that some Fulani herders became sedentary. They simply settled near the boreholes and used agricultural activities as a means of risk spreading (Touré 1990). This has changed the mobility of these herders; now they start migrating in cases of diseases, bushfires, and lack of rain. (Juul 1994). There is usually enough pasture and water and consequently, mobility has often become a means of getting away and not a means of finding pasture and water for the stock.

While part of the pastoral population has become more sedentary, others have become more mobile than before. These are the so-called “Egge-egge”, which means those who are always migrating. They have started a labour-intensive and very mobile livestock production. The herd consists mainly of sheep, these are kept relatively far from the watering points and moved very often to ensure fresh pastures. In the dry season the distance to the borehole is often too long for the small ruminants, hence water is transported from the borehole to the animals. This is done by means of a tractor tube on a donkey cart (Juul 1994). This new technology has been highly admired, because it enables the pastoralists to make better use of the resources and thus increase productivity (Juul 1995). It should be mentioned that this new technology is an innovation made within the pastoral community and not an exogene development initiative.

6.1.3 Consequences of indirect and direct development
Indirect development in the post-colonial period has been detrimental to pastoralists. Grayzel (1990) determines that the most threatening are the limitations being imposed on pastoralists’ basic ability to adapt to changing circumstances. Hence, decreased access to key resources and restrictions on migration patterns are considered important aspects of indirect development. As far as direct development is concerned, the establishment of watering points appears more successful than rangeland improvement in terms of increasing pastoral production. New water supplies have resulted in pastoral innovations and adaptations that have increased productivity. Hence, direct development can help increase the availability and use of range and water.

Pastoralists living in arid and semi-arid areas know drought is a reoccurring event and plan for it through their flexible and adaptive strategies. Both direct and indirect development can alter pastoralists’ strategies for dealing with drought. The issue of this section is how changes in the availability and use of range and water caused by the two types of development have altered pastoralists’ abilities to deal with drought.
Pastoralists’ overall drought strategy can be labelled ‘alternative occupations’. Drought recovery through the use of alternative income activities has been observed by a number of researchers (Dahl 1979, Hogg 1986, Bovin 1990). The most common alternative occupation is agriculture, but possibilities were increased in the colonial period. Bovin (1990) mentions among 15 alternative occupations herbal medicine seller, hired labourer, and water carrier, but also herding for absentee herd owners, wage labour in irrigation schemes, and petty trade can be mentioned (Little 1992a). In this context only changes to agricultural production are of relevance to changes in the availability and use of range and water. However, it is not common for pastoralists to turn to alternative occupations until all strategies within pastoral production are exhausted.

When the amount of vegetation is low, either due to drought or at the end of the dry season, pastoralists herd their flock to high productivity areas. The encroachment of agriculturalists on these areas means that pastoralists lack an important resource at times when resources are scarce, and thus an important drought strategy has been hampered. The favouring of agriculture means that many pastoralists have been forced to rely on agricultural production after droughts. The enforcement of state borders limits the mobility of some pastoral groups.

Direct development mainly concerned rangeland improvement and establishment of watering points. The former included in many cases a reduction in herd size; this left the pastoralist with a smaller herd and thus hampered drought strategies. The establishment of watering points, on the other hand, has mainly been beneficial to pastoralists. Bovin (1990) and Juul (in press) have noticed the existence of two diverting survival strategies in times of stress. One is to increase mobility, the other is to start or increase cultivation and hence become more sedentary. The latter means a change to a more agro-pastoral type of production which will be discussed in chapter 7.

### 6.2 Tenure systems

Three main issues in the post-colonial development of tenure systems can be identified: nationalisation of resources, sedentarisation of pastoralists, and privatisation of pastures. The former is considered an indirect development, while the latter two are considered direct developments. Indirect development in tenure systems in African rangelands has often been part of the favouring of agriculturalists mentioned above. Direct development has until recently focused on pastoral sedentarisation and privatisation of resources, for instance, by the establishment of ranches and sedentarisation schemes (Lane & Moorehead 1994). Contemporary direct development includes attempts at integrating customary tenure regimes into the legislation. However, these are considered along the lines of the new paradigm and will therefore be discussed in the next chapter.

### 6.2.1 The effects of indirect development

The colonial regimes changed many customary tenure systems and imposed difficulties on nomadic pastoralists’ rights to land, but the impact of modern legislation has been just as severe. Nationalisation process that started during the colonial period has now reached even the most remote pastoral areas. The nationalisation has often been carried out with the excuse of ‘the tragedy of the commons’. However, nationalisation often
changes the tenure system from a commons regime to an open access regime, thus starting the (tragedy of the commons) development that was anticipated before the nationalisation (Lane & Moorehead 1994). A recent development has been the changing of tenure regimes from being usage/access oriented to being property oriented. In the previous chapter it was shown that colonial law, which made indigenous land crown or government owned, did not necessarily change the everyday life of the pastoralists. Today, however, the encroachment of agriculturalists on pastoral land and the development of national parks necessarily change the customary tenure.

The major problem for nomadic pastoralists is that their type of production is often not recognised as a proper production allowing the producers to own (or obtain rights to) the land they utilise. Hence, it is not uncommon for pastoralists to start cultivating in order to ensure their rights to land (Sandford 1983). Moreover, the nomadic nature of the production is often used as an excuse for disregarding pastoralists in the allocation of land. Thébaud has investigated this problem in the Sahel countries and explains:

“In many cases, pastoral occupation is not recognised as an effective form of making productive use of/improving land in the same way as clearance and agricultural use.”
(Thébaud 1995 p.21)

Hence, pastoral land rights tend to yield to agriculture. Apart from the difficulties pastoralists experience in retaining their rights to the land, difficulties arise when several usage rights to the ‘same’ area exist. Pastoralists are even more by the fact that they often have usage rights to resources that are registered as owned by the agriculturalists (Thébaud 1995).

Customary tenure systems are still strong in most African countries although they are being restricted through the imposition of new tenure systems. In northern Niger, for instance, customary tenure systems worked out between pastoral communities have been seriously disturbed by the development of modern open access watering points (Thébaud 1995). Management of water development often includes the implementation of a water law. This concerns the ground rules about the overall level of exploitation and about who, under which conditions, may exploit the water resources. The legislation can concern the continuing operation of existing watering points, the establishment of new watering points, or both. The implementation of a water law may involve the recognition of an existing law or custom (de facto or de jure) or it may involve the enactment of a new law altogether (Sandford 1983). Customary tenure systems acknowledging pastoral land rights have often been altered due to the establishment of modern water supplies with open access (Horowitz 1981). Among the Barabaig of Tanzania customary law gives the rights to a well to the clan of the man who digs it, in this way the clan can control the use of the range resources nearby the well (The Ecologist 1992).

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5 It should be noted that agricultural encroachment on harsh rangelands mainly occurred in the 1970s after the favourable climatic conditions of the 1950s and 1960s (Thébaud 1995).
6 Especially in East Africa, pastoral areas have been set aside for tourism. Pastoralists are not allowed to use these areas, because they are accused of destroying the wildlife, etc. However, attempts are being made at coupling conservation and pastoralism (Homewood & Rogers 1991, McCabe et al. 1992, Neumann 1995).
6.2.2 The effects of direct development

Most attempts at changing tenure systems through direct development have been in terms of the establishment of private ranches. Private ranches exist mainly in southeastern Africa. In some cases exclusive rights to the range were hoped to improve the environment (Hitchcock 1990), in other cases the ranches were established during the colonial period (and are mainly owned by white settlers). The existence of private ranches also affects the life of ‘ordinary’ pastoralists. These are, for instance, hampered in moving freely, or their key resources can be withdrawn for the benefit of the ranch (Scoones 1992). However, ranching has not proven superior in terms of improving the environment or controlling the livestock numbers (Abel 1993). Therefore, many ranches have been given up (Sandford 1983). Forced sedentarisation is rare in Africa\(^7\), but governments have encouraged pastoralists to settle and pursue non-pastoral activities (Horowitz & Little 1987). Sedentarisation often involves less flexible tenure regimes such as fixed ownership of resources.

Recent attempts at changing the tenure regimes include private ownership of watering points which means *de facto* private control over pastures near the well (Hitchcock 1990). Moreover, in some areas corridors have been established through non-pastoral land in order to allow pastoralists to move. One example is in the Sudan where a ‘Southern Stock Route’ has been suggested to replace the ‘Northern Stock Route’ (Khalifa et al. 1985). There are certain pre-conditions which must be met in order for corridors to work; foremost grazing should be allowed. Watering points are obviously also needed. Depending on the number of stock passing through an area the corridors should be fairly wide (25-100 km) to ensure sufficient grazing for the livestock; in the Sudan case, the ‘Southern Stock Route’ was recommended to be 40 km wide (Khalifa et al. 1985).

6.2.3 Consequences of indirect and direct development

The tenure legislation has so far predominantly been in favour of non-pastoral occupations, mainly agriculture. This has made it very difficult for pastoralists to ensure their rights to use the range and in some cases also water resources. The customary tenure systems were adapted to the flexible strategies and the variable environment. Indirect development has favoured the needs of agriculturalists and other non-pastoralists, and hence altered many of the customary tenure systems. Direct development has not been very successful as far as tenure regulations are concerned. It is obvious, however, that the lack of pastoral rights to the land obstructs the pastoral livelihood. Hence, tenure systems have potential for future development of the nomadic pastoral sphere.

The effect of tenure legislation on drought strategies is much the same as the effect of the availability and use of range and water. The legislation has favoured agriculturalists and direct development has not improved pastoralists’ abilities to deal with drought situations.

6.3 Exchange and market relations

\(^7\) The ‘ujamaa’ development in Tanzania is an exception (Lane & Moorehead 1994).
The history of exchange and market relations in the past 30 years has been one of commercialisation (Bovin 1990, Salih 1990). Commercialisation is defined as ‘the total or partial shift in production goals from meeting subsistence needs to producing for the market’ (Sikana et al. 1993 p.1). Hence, exchange and market relations have mainly been influenced by indirect development, but there has also been direct development. This has emphasised livestock marketing, market access, herd composition, etc. Principally, there has been a dynamic interaction between direct development and pastoralists’ adaptations to the market. Both in the case of indirect and direct development emphasis is given to the effects on the polarisation of pastoral society.

6.3.1 The effects of indirect development
Market involvement influences pastoral production in many ways. Production often becomes more specialised, because comparative advantage means that products can be acquired through the market. Moreover, when pastoralists become involved in a market economy the perception of pastoral products as commodities causes a reorganisation of production according to new goals. Some authors (Swift 1986, Little 1992b, Zaal 1992) claim that market orientation makes pastoralists more vulnerable. However, this probably depends on the social status of the pastoralists. It is evident, though, that increased production for the market causes the production for subsistence to decrease (Frantz 1986).

Planners often regard live animals as the most appropriate commercial pastoral product and dairy products as mere subsistence. However, this is not correct; among many pastoral households, dairy products are the most important commercial commodities. In subsistence pastoralism milk is the most important product, because it is a major part of the diet and used for exchange with grains (Sikana et al. 1993). When subsistence pastoralism becomes commercial and changes production to commodity production, the exchange value of milk and live animals alters in relation to the use value. However, the changes are not the same for rich and for poor households. Among subsistence pastoralist societies there are systems of exchange between stock-poor/labour sufficient households and stock-rich/labour deficient households. Both types of households gain from exchange systems at subsistence level, but this changes with increasing involvement in a market economy. The market interferes with the customary exchange systems between rich and poor households, so to speak (Fratkin & Roth 1990). Thus, there has been a new polarisation in pastoral societies, which has been mentioned by a number of scientists (see Little 1985a and 1985b, Hogg 1985 and 1986, Ramisch 1996) and is considered an important, but not desirable, development trend. The polarisation can be seen in the different opportunities to cope with drought (see Dahl 1979, Scoones 1992, Juul in press), but perhaps more often it is seen when pastoralists approach the market. Hence, the following discussion of the effects of increased market integration is explained for stock-rich and stock-poor households separately. Obviously, there are households that are neither rich nor poor, these will not be mentioned separately here as they are supposed to rely on a combination of stock-rich and stock-poor strategies, depending on their situation.

8 A discussion of the differences between development approaches (e.g. livestock development versus pastoral development, top-down versus bottom-up) is too broad for the present context, but an introduction to the issue can be found in Salih 1991, Toulmin 1991.
9 The terms exchange and use value are explained in chapter 5.
Stock-rich households
In this context stock-rich (or simply rich) households refer to households which have 
‘surplus’ stock, meaning stock that is not needed for immediate production (although 
the ‘surplus’ may serve as insurance against drought, raids, etc.). This surplus can be 
converted into money and reinvested through the market. Pastoralists are seen to invest 
both in retail trading (Dahl 1979, Hogg 1985) and agriculture\textsuperscript{10} (Barth 1986). The 
investment in other spheres of production can thus serve as a means of risk spreading 
(Horowitz & Little 1987). Another common production change among rich households 
is a decrease in the milking of the stock in order to remove the competition between 
calves and humans (Sikana et al. 1993). In this way herd productivity is increased and 
thus live animal sales. The pastoral diet also changes, hence more milk than usual is 
exchanged for grain which in turn means a lower self-sufficiency and greater 
dependence on the market or exchange with agriculturalists. The tendency is confirmed 
by Grandin (1988) who has studied the Kenyan Maasai. She found that among the 
stock-rich households only 40% of the lactating cows were milked, and they were only 
milked once a day. Similar results are found among the Fulani of Nigeria and the 
Baggara of Sudan (Sikana et al. 1993).

Whether rich pastoralists choose to market live animals or dairy products depends on 
prices as well as marketing possibilities. In Kenya, for instance, where the pastoral dairy 
sector has to compete with a formal dairy sector, rich pastoralists choose to emphasise 
live animal sales and only produce milk for the basic household needs (Sikana et al. 1993). As explained by Herren (1990) in a study of Somali pastoralists, dairy marketing 
can be used to make the most of fluctuating market prices for pastoral products. In this 
case dairy products are mainly marketed in the dry season when dairy prices are high 
and live animal prices low. The money gained from the sale of dairy products is often 
used to purchase grains that are also sold at high prices in the dry season, but needed for 
the diet. Similarly, in the wet season pastoralists tend to withdraw from the dairy market 
with low prices and focus on the sale of live animals that are sold at high prices (Sikana 
et al. 1993). However, one could argue that the most rational course of action would be 
to buy all the grain needed at the time when the price is lowest. The study does not 
discuss this option, so we can only guess why: pastoralists may not know how much 
grain they need, thus they only buy small quantities at a time; they may not want to 
carry all the grain for several months; or they may want to exchange with different 
groups at different times of the year. Whatever the reason is, it can be concluded that 
sufficient livestock numbers allow the household to sell dairy products and live animals 
when the relative advantage of each enterprise is greatest.

Stock-poor households
In this context stock-poor (or simply poor) households refer to households having a 
stock deficit, meaning less stock than needed for mere subsistence in average years (and 
which in cases of drought, raids, etc., will usually be devastated).

For poor households the involvement in trade and exchange is often a matter of 
survival. They exchange pastoral products for agricultural products (either directly or 
through the market) in order to get more calories, hence they change from milk to grain

\textsuperscript{10} It might appear strange that pastoralists invest in agricultural activities as the opposite - that 
agriculturalists invest in livestock due to the scarcity of other investment objects - is also the case (see e.g. 
Barth 1988). It should be kept in mind that the pastoralists investing in other spheres of production are 
those already involved in a market economy.
as the main staple of the diet (Sikana et al. 1993). For poor pastoralists the sale of live
animals will be the sale of their productive resource; hence, poor pastoralists seek to sell
dairy products as the only pastoral product (Holden & Coppock 1992). However, they
often have to sell live animals as well. Usually they wait as long as possible, in the wet
season there is milk to be sold from lactating cows, but in the dry season when the cows
dry out they might have to sell live animals. In the dry season the prices for live animals
are low and the grain prices high, as mentioned. The poor pastoralists therefore appear
to have a ‘perverse price-response’\(^{11}\). As milk is used for exchange with agricultural
products the cows are milked more often than cows from stock-rich owners. Grandin
(1988) found that stock-poor Kenyan Maasai milked 100\% of their lactating cows, and
milked them twice a day. Furthermore, poor Maasai households tend to stay near the
watering point to water their stock frequently as this increases the milk output (Talle
1988). Also, the herd composition of poor pastoralists differs from that of rich
pastoralists by having a higher number of cows in the herd (Grandin 1988).

Traditional herd splitting (see Dahl & Hjort 1976 for advantages and disadvantages, and
Upton 1986 for an example) can also be adapted to pastoral commodity production. In
the case of commercial dairy production, the herd is split up into a producing unit (the
lactating cows and some calves) and a subsistence unit. The former is kept close to the
centre of demand for dairy products while the latter unit can utilise remote pastures. In
the case of commercial production of live animals, the herd is split up into an
‘investment’ herd and a ‘subsistence’ herd. As the subsistence herd in this case consists
of the lactating cows it is kept close to the camp, while the ‘investment’ herd, consisting
of the best beef stock, is herded on the best pastures or close to the market (Sikana et al.
1993).

Among the Samburu of Kenya the use of the commercial market was found to vary
according to the herd-owner’s life cycle: for young men it is common to have wage-
employment outside the pastoral system. The money earned this way is used to build up
a herd through the commercial market from other Samburu. When the herd is large
enough and has the right composition the young men return to the pastoral network and
consolidate the social systems through traditional livestock exchanges. At this stage
most sales are to finance their children’s secondary education, while purchases are
mainly of small-stock to ensure risk spreading through diversification. The final stage of
the herd-owner’s life cycle relates to older men who are mainly concerned with
consumption and labour saving, hence they use the market to exchange their cattle for
goats which are easier to herd and consume (Kerven 1992). To sum up, for the Samburu
livestock still serve as a capital investment; the commercial market serves to a large
extent as a means to continue subsistence production. Young men use the commercial
market to acquire and accumulate livestock, middle-aged men use the market to
consolidate and sometimes ‘cash in’ their investment, while old men use the
commercial market to ‘cash in’ their livestock savings.

One last issue that should be mentioned here is the effect of sales of meat from the EU.
Several authors (Speirs 1994, Toulmin 1995) have mentioned that the sale of cheap
meat in the African countries hampers pastoralists’ possibilities to obtain reasonable
prices for their livestock. It can be debated whether this is indirect or direct

\(^{11}\) The perverse price-response is explained in chapter 3.
development. But direct development is by definition supposed to be beneficial for the
target, and the sale of cheap meat from the EU certainly does not improve the livestock
marketing of the pastoralists. Thus, it must be an indirect development.

6.3.2 The effects of direct development
Nomadism is often considered a constraint for pastoral marketing, and it is shown that
the closer to the market a certain pastoral group exists, the higher the sale of pastoral
products (Sikana et al. 1993). However, pastoralists themselves claim that nomadism
ensures a higher productivity than sedentary pastoralism; hence, the nomadic lifestyle is
preferred even among pastoralists who have adapted to the market situation if products
can be marketed efficiently without the need for a permanent residence. Examples of
marketing adapted to nomadic pastoralism are mobile cheese factories or motorised
buyers as seen in the Sudan (Herren 1990). However, in the latter case transport to the
market has to be paid for, thus as market distance increases, dairy prices decrease. This
is a problem especially for poor households that cannot afford to lose income on dairy
products by being far away from the market, hence ‘mobility becomes a luxury which
poorer households can no longer afford’ (Sikana et al. 1993 p.21). In Somalia range
reserves have been established close to cities to have lactating cows close to the market
and/or to allow live animals to recover after transport and to wait for the right prices
(Sikana et al. 1993).

Means enabling the pastoralists to destock and restock fast have been mentioned as
essential for flexible strategies (Horowitz and Little 1987). There are several destocking
options: livestock can be taken out of the system through slaughter, or they can be
moved elsewhere (Toulmin 1995). In cases of drought suggestions have been made to
bring in fodder to permit the survival of livestock. However, this option has only proven
to be appropriate to a selected group of animals of high value (Toulmin 1995).
As far as selling the animals is concerned, this can be done early in the dry season,
when the livestock are still in good shape, to another owner who has access to means of
feeding the animals. Often pastoralists wait to sell in the hope that conditions will
improve; in this case the livestock are often in poor condition and have to be
slaughtered, but some value can be obtained from the meat and the hides (Toulmin
1995). The problem experienced by pastoralists is the risk associated with destocking
too early and then finding out that the rainfall returns and pastures improve, compared
to the risk of not reacting fast enough so the livestock end up in poor condition before
they are sold and are sold at low prices (Toulmin 1995).

Pastoralists show a greater willingness to sell livestock early in the drought cycle now
compared to the 70s (Toulmin 1995). This is confirmed by Kerven (1992) who found
that pastoralists in Kenya have become more price-responsive, and hence livestock sales
are no longer concentrated in the dry season. In West Africa Kerven (1992) found an
increased market orientation due to drought and other events, which could be detected in:
• Better timing of livestock sales (corresponding to Toulmin 1995)
• Changes in herd composition (corresponding to Thébaud et al. 1995 and Juul in
  press)
• Greater dependence on cereals (corresponding to Grandin 1988 and Sikana et al.
  1993)
• Changes in seasonal acquisition and cash expenditures on cereals

In recent years changes in species composition of the herd have been commonplace as pastoralists have tried to adapt to changes in the market situation as well as in the natural environment. Sheep, for instance, command a high price and are usually easy to market. Also, sheep can reproduce quickly after dry or drought years. A change from a cattle dominated herd to a flock dominated by sheep can hence be a behavioural adaptation to both the market and the climate (Thébaud et al. 1995). However, the keeping of sheep is more labour demanding, because they cannot, as opposed to cattle, be left to roam free, and they have to be watered more frequently. In Senegal transport of water in tubes is a labour demanding way of supplying herds with water, but the higher labour input pays off in terms of money, although the risk increases (Thébaud et al. 1995, Juul in press).

One characteristic of livestock supply is the very large fluctuations in market flows both within and between years. This has severe implications for the marketing and sale of livestock. Another characteristic is that there is extra cost involved in taking animals to the market due to the sparse population and due to the difficulty in collecting a herd large enough for animal transport. Trekking on foot is still the cheapest way to get livestock to the market in Africa - not only the cheapest in direct money terms, but also in terms of mortality and shrinkage (Sandford 1983).

6.3.3 Consequences of indirect and direct development

The commercialisation and integration in the market economy (indirect development) are accentuating the polarisation of the pastoral society. Some would claim that commercialisation even started this polarisation, but whatever the reason for it, it is evident that many of the pastoral systems of reciprocity have disappeared. Direct development has been quite diffuse until now, but pastoralists have tried to adapt to the changes in marketing situations, livestock prices, etc. There appears to be a potential for future direct development within this area, although the risk of increasing social differences should be kept in mind.

Generally increased commercialisation has opened up new opportunities for pastoralists. Unfortunately, however, commercialisation has accentuated the polarisation of the pastoral societies. For rich pastoralists, the market has increased the possibilities to stay rich, but for poor pastoralists, market response is too often a ‘perverse supply-response’. This is especially the case in the dry season and in drought situations. However, it is hard to determine what the possibilities would be for the poor pastoralists if they could not use the market in drought situations. Some argue that they would not be better off (Holden et al. 1991).

Certainly, direct development appears to be able to enhance drought strategies for most pastoralists. There are not many examples yet, but the pastoralists’ dynamic adaptation to the few existing initiatives indicates that this is an area for future development.

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12 This could also be characterised as a matter of adequately defining supply. Is it long-term or short-term supply? Should the livestock supply be calculated on the basis of the total number of stock owned by the pastoralists, or should the consumption and investment needs be subtracted?
6.4 Discussion and summary

This chapter has shown that encroachment on pastoralists’ key resources and the lack of legislation concerning pastoralists’ rights have hampered pastoral drought strategies. It is very difficult to determine the effects of commercialisation on drought strategies. Commercialisation has assisted at least some pastoralists in getting rich. Nomadic pastoralists have had extensive exchange relations with agriculturalists as well as interactions through which pastoral herds were allowed to graze on stubble fields because they supplied manure. Both the exchange and the interactions are changing. The direct exchange has changed to trade through the market and the interactions have changed to competition in many cases. As far as the interactions are concerned, these have changed because pastoralists and especially agriculturalists have become more diversified in their activities i.e. pastoralists cultivate and agriculturalists keep livestock. Pastoral production has changed due to the increased involvement in the market. Milk production used to be the objective for many nomadic pastoralists. Now pastoralists can either consume all the milk from their stock, they can exchange or sell the milk, or they can deflect it to live animal growth. In the past decades dairying has increased in some places and decreased in other places depending on the marketing conditions for the pastoralists. In addition, infrastructure can change movement patterns and marketing. Experiments in Sudan have proven that settlement of pastoralists is not a pre-condition for dairy marketing.

The present chapter has focused on the changes in availability and use of range and water, tenure systems and exchange and trade relations in the past 30 years. The main issues have been the effects of indirect and direct development, and the consequences of these forms of development for drought strategies. The evidence is ambiguous and general trends are hard to retrieve: the cases related to each issue show different trends, and each main issue provides different conclusions. However, it appears that with indirect development the traditional arrangements of reciprocity have been lost, which has caused a polarisation. Direct development has managed to improve pastoralists’ possibilities in some cases and in other cases not. Nevertheless, it is possible to determine areas of future potential. This is partly due to the many ‘trial-and-error’ experiments and due to the new paradigm, which can help explain what went wrong. The next chapter discusses what can be done in the future and how the new paradigm can support direct development.
Chapter 7

FUTURE ADAPTATIONS OF NOMADIC PASTORALISM

Thus, old forms persist, but with a new meaning and content, and pastoral society continuously reinvents itself.

Whereas the proceeding chapter addressed present adaptations of nomadic pastoralism, the purpose of this chapter is to go further and consider future adaptations of the utilisation system. This is done in two ways: first, the implications of the new paradigm for development projects are discussed, and then scenarios for the development of nomadic pastoralism are outlined. Hence, the first part of the chapter mainly concerns direct development, and the second part mainly concerns indirect development. In the final ‘discussion and summary’ the two types of development are compared and discussed, and some recommendations for future development are provided.

The three main themes used in the previous two chapters are only used in relation to direct development. Indirect development is discussed with respect to the development objectives of pastoralists and governments. A model, showing the development of nomadic pastoralism that can be identified today, is used for the discussion of indirect development, and the consequences of this development. The final discussion is based on two assumptions. The first is that nomadic pastoralism is a rational, non-destructive utilisation system for African rangelands (the new paradigm), and thus that the direct development will not change this system altogether. The second assumption is that indirect development necessitates a constant adaptation (behavioural as well as cultural) of nomadic pastoral utilisation systems.

7.1 Direct development

In this part of the chapter the three main themes, availability and use of range and water, tenure systems, and exchange and market relations are used. The implication of the new paradigm is discussed in relation to existing projects that appear to be based on the new paradigm and in relation to the design of new projects.

7.1.1 Availability and use of range and water

In the preceding chapters it was revealed that opportunistic management was the most appropriate management tool for the use of range and water in unpredictable environments (e.g. Fratkin 1991, Hogg 1992, Anderson 1993). Opportunistic management involves seizing opportunities when and where they exist. For this purpose flexible strategies are used (Sandford 1995). An important flexible strategy is, as mentioned, to herd the livestock into areas where feed is available (Solbrig 1993). However, the limitations being imposed on pastoral movement and the declining access to key resources call for new flexible strategies. These include (Scoones 1995):

- Increasing locally available feed by importing fodder or enhancing feed production

1 Waller & Sobania 1994 p.62.
Future adaptations of nomadic pastoralism

- Destocking livestock numbers through sales during drought and restocking when feed is available again after the drought.
- Application of new technology, for instance, transportation of water in tractor tubes on donkey carts for small ruminants.
- Reducing livestock feed intake during droughts through shifts in watering regimes.

Some scientists claim there is a need for enhanced primary production in rangelands (Sandford 1995, Scoones 1995). In the development of rangeland productivity the focus has usually been on productivity in “normal” years and the range as a whole. However, the problems faced by pastoralists concern rangeland productivity in dry/drought years and the lack of key resources. Hence, enhancement of productivity should concern drought situations and key resource areas (Scoones 1995).

The establishment of new watering points has often been successful with respect to the availability and use of range and water, also when considering the implication of the new paradigm. This has been discussed in chapter 6: the positive effects concerning increased availability and use of range and water were addressed in 6.1, and the negative effects relating to changes in tenure were mentioned in 6.2. Even though many water projects already exist, there are probably still areas that could be utilised better in the dry season if there was access to permanent water. Hence establishment of watering points is still a possible area of future development.

The problem concerning range and water is often considered a tenure problem rather than a question of availability and use (Galaty 1994). In chapter 2 it was argued that the traditional pastoral management of range and water was appropriate, and recent experiences have shown that pastoralists adapt (both behaviourally and culturally) to changes in the availability of range and water. Thus, direct development may be more successful when addressing tenure issues than when addressing range productivity, etc.

7.1.2 Tenure systems

Along with the paradigm shift it has become apparent that pastoralists in disequilibrium ecosystems will have little advantage from exclusive tenure arrangements; the unpredictable environment is best utilised by ensuring the right to use a large area and hence by keeping a high mobility. Much consideration has been given to making tenure regimes efficient. In vast rangelands investigations have shown that overly formal appropriation takes up too much time and labour. Moreover, attempts at privatising pastoral rangelands appear dangerous and counter-productive to the nomadic pastoral utilisation system (Thébaud 1995). However, the so-called key resources have often been subject to tight regulations under the customary tenure regimes, and nomadic pastoralists appear to gain from such regulations of scarce resources.

An increasing number of scientists are now considering customary tenure systems (the most) appropriate for rangeland management based on opportunism and flexible strategies (Behnke 1994, Lane & Moorehead 1995). The difference between indigenous pastoral systems and modern range management systems can be summarised as follows:
Table 7.1 Some differences between pastoral rangeland management and modern rangeland management (Behnke 1994).

<table>
<thead>
<tr>
<th>Land rights</th>
<th>Pastoral rangeland management</th>
<th>Modern rangeland management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• customary tenure systems</td>
<td></td>
<td>• written law</td>
</tr>
<tr>
<td>• fluid</td>
<td></td>
<td>• stable</td>
</tr>
<tr>
<td>• usufruct rights</td>
<td></td>
<td>• property rights</td>
</tr>
<tr>
<td>• mixed, communal and individual</td>
<td></td>
<td>• uniform, either communal or individual</td>
</tr>
</tbody>
</table>

Herd growth • opportunistic
• conservative

In Senegal attempts at including these aspects can be seen in the legislation. In 1964 all land except public or private property was constituted national property. In 1972 a law relating to rural communities came into action. This aimed at letting the rural population manage their affairs through the establishment of rural communities. Finally, in 1991 the Ministry of the Interior came up with a proposal for considering pastoralism a productive land use, and hence giving pastoralists better opportunities to own the land they use² (Thébaud 1995). However, legislation including the pastoralists is far from sufficient as long as the problem with key resources is unsolved. Pastoral key resources can often be utilised by agriculturalists, and many of the areas have already been taken over, as mentioned. Unless nomadic pastoralists are secured rights to key resource areas their utilisation system is still at jeopardy. Also, the public status of many modern watering points should be reformed in order to enable pastoralists to regulate the use of the pasture through the access to water, a strategy which was common in many customary tenure systems. However, it should be mentioned that attempts at privatising watering points in Niger have proven unfortunate for the resource management (Thébaud 1995).

There is no doubt that Thébaud is right when she states:

“Making tenure secure is thus an essential future concern.”

(Thébaud 1995 p.iv)

But secure tenure is not a matter of ensuring the pastoralists ownership of the land they use: nomadic pastoralism requires access rights and usufruct rights more than property rights (Barrow 1990). Customary tenure systems have included multiple use of an area which ensures the optimal utilisation of the resources and allows flexible strategies to persist (Painter et al. 1994). Hence, future tenure legislation should emphasise flexibility. Moreover, it is important to assure rights to grazing land for the pastoralist who might temporary be out of pastoralism. If land has been taken over by agriculturalists before the pastoralists are able to restock, it is very hard to return to pastoral production (Toulmin 1995). The flow between the different spheres of production is not necessarily negative; actually, the use of the market can be considered a flexible strategy that enables pastoralists to remain in pastoralism.

7.1.3 Exchange end market relations

The fundamental problem underlying pastoral livestock marketing in drylands is the variability in supply and prices (Holtzman & Kulibaba 1995). This problem is partly

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² The proposal also included other forms of land use not relevant for the present purpose.
Future adaptations of nomadic pastoralism

due to climate variability which means that pastoralists are very eager to sell in times of
drought. As many pastoralists are usually hit by a drought and want to destock, the
market experiences an increase in supply but not in demand, which causes the prices to
fall. When the drought is over pastoralists want to restock, which causes the prices to
rise again. Many development projects have tried to settle drought prone pastoralists in
agricultural schemes, but most often this has not been a success (e.g. Turton 1984, Al-
Najim & Briggs 1992, Fratkin 1992). The reason may be that the projects do not
correspond to traditional responses to drought (Fleuret 1986).

When pastoralists want to rebuild their herd after a drought it would be sound policy to
assure means of restocking because pastures recover faster than herds, and thus pasture
can end up not being utilised. Moreover, it is cheaper to help destitute pastoralists to
become self-sufficient again than to support them in relief camps (Toulmin 1995). The
NGO ‘Oxfam’ has experience from restocking programmes in East Africa; their
experience shows that it is difficult to design efficient restocking programmes (Walker
1988). Important issues are deciding who is to pay for restocking, when the restocking
should be started, and which livestock species should be used (Bush 1995). If the
restocking starts ‘too early’ the stock is likely to be exchanged for grain. Hence
supplementary cereals have been provided with the stock, which is efficient, but very
expensive. Thus, the development agency has to consider if all the destitute pastoralists
should receive some, but perhaps not enough, help or if some of the pastoralists should
receive enough help to be able to remain within the pastoral sphere of production
(Sperling 1987, Walker 1988, Bush 1995). It would be ideal if the pastoralists were able
to pay for the restocking themselves, but this requires a close integration with the
market economy, reliable prices at times of destocking, alternative investment
possibilities (not livestock), and probably alternative income possibilities (Toulmin
1995).

A list of important aspects of pastoral marketing, not only with respect to restocking
possibilities, can be made:

• Provision of convenient and reliable points of sale.
• Provision of improved channels of communication through which buyers and sellers
can obtain information.
• Provision of facilities that can handle increased quantities of livestock and products.
• Provision of facilities to reduce transportation costs and time.

Many of these have already been mentioned, so in this context only the latter point is
addressed. Trekking has been the most common means of transporting livestock to the
markets (Sandford 1983). However, this is changing. Trekking has become more
difficult and risky because farmers have encroached on trek routes, because risk of theft
has increased, and because of corrupt authorities (Holtzman & Kulibaba 1995). Moreover,
efficient marketing requires efficient delivery of livestock to the market. While trekking of a herd from Burkina Faso to Togo takes 7-8 weeks, the delivery time for trucked livestock is about 48 hours. Hence, the use of truck (or rail) can take
advantage of favourable market conditions far better than trekking (Holtzman &
Kulibaba 1995).

As stated in chapter 6, increased pastoral involvement in the market economy has
probably accentuated the polarisation of the pastoral society, as well as provided new
opportunities for the pastoral economy. There is no doubt that the commercialisation will continue; if the interests of pastoralists are acknowledged and livestock marketing improved, commercialisation may help pastoralists to remain livestock producers.

7.2 Indirect development

The discussion of indirect development is divided into three sections. First, a model is provided, showing aspects of the development of nomadic pastoralism that can be identified today and which are likely to apply to the future as well. Then, development objectives of pastoralists and governments are outlined in order to determine future aspects of interest for the two groups. Finally, possible adaptations to future indirect development are briefly mentioned.

7.2.1 Model of indirect development

In the following a model is presented that shows developments of nomadic pastoralism. It should be kept in mind that the ‘fulfilment’ of the development described in the model depends upon indirect, as well as direct development. The type of pastoralism discussed in this work is nomadic pastoralism. However, nomadic pastoralism is considered unlikely to persist. The factors changing nomadic pastoralism are indirect development and the development objectives of the pastoralists.

Bovin & Manger (1990) argues that there has been a change from nomadic pastoralism towards agropastoralism in the past decades. After the droughts of the 1970s and 1980s many pastoralists have been forced to cultivate, and hence to become more or less sedentary in order to survive. This has also been observed by Juul (in press) in Senegal, where devastated pastoralists opted for irrigated plots. However, Juul argues that these are the very poor pastoralists who have no other option than to use agriculture as the alternative survival strategy. According to Bovin (1990) this change to agropastoralism is not desirable, as it is better to have agriculturalists and pastoralists who are interacting than to have cultivation and herding integrated.

As mentioned in chapter 6, another tendency has been towards increased mobility and commercial production (Bovin 1990, Juul in press). This has only been experienced in a few cases, but there is a trend towards a greater willingness to sell and adapt to the market. Hence, there seem to be two developments of nomadic pastoralism at the moment. One is towards increased integration with agricultural production which can facilitate subsistence production. This is thought of as a risk spreading strategy through diversification of the activities. The other development trend is not as clear yet, but it appears that there is a tendency to change to a commercial production. This means lower self-sufficiency, but it gives possibilities for diversifying investments through integration in a cash economy.

Figure 7.1 is a model of these development trends. The model is created on basis of the information provided in the preceding section and the preceding chapters. The concept is inspired by Ingold (1980 p.4), but this model is developed by the author:
Figure 7.1 Developments of nomadic pastoralism that can be observed today.
Figure 7.1 illustrates three types of pastoralism, namely nomadic pastoralism, agropastoralism and commercial pastoralism. The three types are defined according to three variables: degree of interaction with agriculturalists, degree of agricultural production, and degree of commercialisation. These three variables are considered the most important determinants in the present context. Mobility is not illustrated in the model, because mobility appears to vary in an unpredictable manner. Some authors claim that market integration will cause less mobility, and others that commercialisation will not influence mobility (Juul in press). Moreover, some agro-pastoralists appear to have a low mobility, while others leave their flock with a herder. Thus, the agro-pastoral herd can be very mobile. Each of these three types of pastoralism is unlikely to exist in a ‘pure’ form, and therefore most pastoralist systems will be somewhere within the triangle. A third dimension illustrating intensity could have been added to the figure: depending on the potential of the niche, intensity could be used to illustrate areas of future development.

7.2.2 Development objectives

First the development objectives of the nomadic pastoralists themselves are discussed and then the development objectives of governments are discussed. It is difficult for a non-pastoralist to fully outline the objectives of a pastoralist. Moreover, the objectives and values of different pastoralist groups will vary. This is due to the differences in their characteristics: their cultural and political history, their interactions with their natural environment, etc. However, there are values and objectives that are likely to be held in common in pastoral societies. For instance, livestock keeping is usually rated higher than cultivation, and freedom of movement is highly appreciated (Kirk-Greene 1986, Bovin 1990, Nicolaisen 1996b). Also, the unpredictable environment is likely to make pastoralists concerned about long-term viability. Pastoralists themselves see their future as much more secure if an alternative income is possible (Sandford 1995). Hence, important objectives of the pastoralists appear to be keeping the freedom of the individual to manage the herd, ensuring risk spreading through a diversity of income possibilities, and retaining control of key resources. In the previous chapter it was shown that pastoral people in most countries have become a minority group within the last 100 years. They have been administrated by people with little experience and understanding of pastoral life (Horowitz & Little 1987). Thus, a major objective for many pastoralists is to retain control over their lives - their herds and their resources.

When looking at the pastoral development objectives from the point of view of the governments, it is obvious that they are different from the objectives of the pastoralists. Three main themes can be distinguished: economic, environmental, and socio-political development.

One development objective regarding the economy can be to develop the pastoral sector in order to make the pastoralists supply the nation with animal products. However, it can also be to change the pastoral sector altogether, if pastoralists are viewed as poor, drought-prone people whose welfare will increase when engaged in another occupation (the old paradigm). The environmental development objective concerns the vulnerability of pastoral areas. As mentioned in chapter 2, the understanding of the

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3 Ranching is defined in chapter 2 (footnote 10). From the definition it is appreciated that ranching and commercial pastoralism are two different types of production.
these ecosystems has changed within the last decade, and hence the objectives have changed - or should have changed. As far as socio-political objectives are concerned, these often have to do with the elusive nature of nomadic pastoral societies. In most countries, nomadic pastoralists are a minority who are split up into different nations in spite of their ethnicity (Schlee 1989). Movement in search of pastures often means crossing national boundaries. Hence, a history of conflicts with neighbours and governments can often be traced. A common government objective is therefore to reduce the risk pastoralists can present to national security. This is done through means of integrating the pastoralists in the nation, be it through settlement schemes, attempts at reducing the self-sufficiency of the pastoralist societies, or integration in the market economy (Sandford 1983). In many countries however, development strategies for nomadic pastoralists have been synonymous with development strategies for the rest of the society and emphasis has been given to extension of education and health services. This is likely to be the most important area of government development in the future.

7.2.3 Adaptations to indirect development
The most important aspects of indirect development are considered to be commercialisation and the extension of education and health services. The latter two aspects are considered indirect development, because the extension of education and health services has the whole population and not only pastoralists as target group. Education and health services are easier to provide to a sedentary population than to a mobile one. Therefore it is believed that some kind of semi-sedentary livelihood will occur. However, it has been shown that mobility is the best way to utilise resources, and that animals usually are in better shape when herded than in a fenced paddock. Mobility is therefore expected to persist as far as herding is concerned. Mobility can be considered a double-concept:
1. Displacement throughout the year, and
2. Displacement throughout the day or week.
These two concepts can correspond with:
1. Mobility from the viewpoint of both residence and pastures, and
2. Mobility from the viewpoint of pastures only.

A likely consequence of the provision of education and health services is changed mobility. It can either be small-scale migrations, i.e. migrations throughout the day or week. Or only a part of the family may migrate (this is often the case already), which means mobility from the viewpoint of pastures only. Galaty (1989) claims that nomadic pastoralists often shift towards commercial pastoralism when they become educated. Hence, education is believed to enhance market integration.

7.3 Discussion and summary
In chapter 1 it was mentioned that the number of nomadic pastoralists was declining. In chapter 3, estimates for the nomadic pastoral population of Africa were provided. These were about 20 years old, because it was impossible to obtain new information from the literature, and the ODI, which was one of the sources for pastoralist numbers in the 70s, did not answer an inquiry. Hence, we know nothing about the development in the number of people pursuing pastoralism. What we know is:
• The number of people living solely as subsistence nomadic pastoralists is decreasing as most pastoralists are pursuing other activities as well as pastoralism i.e. agriculture, commercial pastoralism, or trade.

• There are probably fewer people who are nomadic today, as nomadic pastoralists have been hampered in their attempts to move. This is due to settlement projects, the creation of borders that must not be crossed (at least without permission), agricultural encroachment that has limited traditional movement patterns, etc.

• The droughts (and development) have meant that a lower number of people are actually living as pastoralists today, as many are living in relief camps (mainly in East Africa) or pursuing other means of livelihood.

It should be kept in mind that many of those who are supporting themselves through wage labour, by receiving famine relief, etc., still consider themselves pastoralists in the respect that they regard herding as the most honourable livelihood, and would be pastoralists again if they had the financial means to rebuild a herd. Together this means that while there is strong indication that the number of nomadic pastoralists has been declining this may not continue in the future. Also, nomadism can be decreasing while pastoralism is increasing (Frantz 1986). Freedom of movement is one of the issues that should be dealt with if nomadic pastoralism is to continue in the future. Although there have been a few investigations of the importance of movement for viable herd management, there have hardly been any dealing with the importance of nomadism for the human population, for their culture, etc. However, there are indications that freedom of movement is also important at least for some nomadic pastoral groups (Kirk-Greene 1986). On the other hand, it has been mentioned that there are new groups of herd owners today. These are agriculturalists who rarely had livestock previously, but now have invested their money (earned from cash crops for instance) in cattle, and there are various kinds of business men who own a herd (absentee herd owners). The question is how this change in ownership should be interpreted? That there has been a mere change of ethnic group owning the livestock? Or that there has been a major change in strategies both within the pastoral system and the agricultural system? It is hard to give a simple answer. Moreover, the tendencies are so variable that it is difficult to generalise.

The first part of this chapter concerned direct development and the development initiatives that have appeared along the lines of the new paradigm. It was appreciated that nomadic pastoralism can still be a viable means of livelihood provided nomadic pastoralists are not marginalised as hitherto.

In the second part of this chapter, a model was presented outlining developments of nomadic pastoralism - or away from nomadic pastoralism, perhaps. One development is from nomadic pastoralism to agropastoralism, another from subsistence nomadic pastoralism to commercial pastoralism. Furthermore, the development objectives of pastoralists and governments were outlined. The most important development objectives of the pastoralists are summarised as the freedom of the individual to manage the herd, risk spreading through a diversity of income possibilities, and control of key resources. The most important development objectives of the governments were believed to be the extension of education and health services. Pastoralists are considered capable of adapting to these objectives.
Chapter 8

CONCLUSION

Yet even though communities have dissolved and people have died, pastoralism itself has always survived.1

The conclusion is divided into two sections. The first section examines the findings of the study, and the second section addresses the method applied for this study, as this has not yet been evaluated. The method is theoretical in the sense that it does not include results of new field studies or any original data material. Rather, it builds on other authors’ theories and results. Hence, the implication of using many different case studies is discussed.

8.1 The findings

The findings are elaborated in two subsections. The first addresses the scope of the study in order to determine if the questions have been adequately answered. The next evaluates the answers of these questions.

8.1.1 Scope

As mentioned in chapter 1, the purpose of this thesis was to investigate the adaptation of the nomadic pastoral utilisation system in the past, the present, and the future. This was done by addressing the following questions:

1. What are the origins and spread of nomadic pastoralism?
2. How has nomadic pastoralism adapted to changes in the past?
3. How is nomadic pastoralism adapting to present changes?
4. How can nomadic pastoralism adapt to changes in the future?

The first question was addressed in chapter 4. Colonialism was considered the most important change in the past, hence the second question was elucidated in chapter 5 with emphasis on the impact of colonialism. In chapter 6, which answers question 3, emphasis was on the impact of drought and development. Finally, the answer to the fourth question is found in chapter 7, which emphasises the implication of the new paradigm. In chapter 5-7 the questions are debated with respect to the following themes:

- Availability and use of range and water
- Tenure systems
- Exchange and market relations

These themes were considered relevant, because they are discussed in most of the recent literature. Moreover, the themes cover a range of aspects of nomadic pastoralism - the management of resources and interaction with surrounding societies - which are of importance to an ecological account of the nomadic pastoral utilisation system. In the following the results of the study will be discussed with respect to these themes, but

1 Waller & Sobania 1994 p.61.
instead of following the order of the thesis (where the all three themes are discussed in relation to the past, the present and the future), each theme will be discussed separately here. First, however, the analytical framework of the thesis should be addressed.

The thesis is based on the new paradigm which was elaborated in chapter 2, and the implication of the new paradigm has been discussed whenever it was considered important for the results. The approach of the study was a combination of human/cultural ecology and human adaptation. In this context it might come as a surprise that emphasis has been given to market relations, yet the three main themes were analysed with respect to their influence on the utilisation system.

The study is based on case studies from different parts of Africa. It is not always straight-forward to use material from so many nomadic pastoral groups, on the other hand it is necessary to have a wide knowledge if general trends are to be outlined. The various nomadic pastoral groups of Africa have different histories, they live in different environments, they have different cultures, etc. Of course there are common characteristics, some of which were outlined in chapter 3, but it can be hard to find general trends. As all cases cannot be represented, it is necessary to take samples. In this study correct sampling is difficult, because there is no population to sample from; hence the sampling is more or less random and some groups may have been given too much attention while other have not received enough.

8.1.2 Evaluation of the findings

In this section the findings of the thesis are evaluated. The three main themes are considered separately, as mentioned, but first the origins and spread of nomadic pastoralism (the first question) should be mentioned. Finally, some general results are discussed.

Origins and spread of pastoralism
The origins and spread of nomadic pastoralism in Africa are very diffuse. Foremost, the nomadic aspect is very difficult to detect. As far as origins are concerned, it appears that pastoralism originated in the Sahara region c. 7000-8000 BP. Pastoralism is assumed to have had many origins in different places, at different times, thus both agriculture and hunting may have preceded pastoralism in Africa. However, it appears from the available evidence that pastoralism in the Sahara region originated from hunting. It took about 6000 years before the pastoral utilisation system reached southern Africa, but it had its first appearance in East Africa c. 3000-4000 BP. Hence, pastoralism is a very old cultural adaptation to a variable and unpredictable environment.

Availability and use of range and water
When range and water were abundant competition mainly concerned high productivity areas, but population growth has increased pressure on most resources. The encroachment of agriculturalists on the key resources has hampered the flexible strategies of the pastoral utilisation system. There is no doubt that this pressure will continue in the future, hence the availability of range and water should be ensured. This can be done by establishing watering points in under-exploited rangeland, by increasing dry season feed production, or by importing fodder for the livestock in the dry season.
Tenure systems
The customary tenure systems appear to have been adapted to the pressure on the resources. Most customary tenure systems have allowed for flexible strategies by employing a number of different rights e.g. access rights, usufruct rights, priority rights, etc. Many of these systems have been destroyed in the colonial and post-colonial period, as legislation has emphasised property rights. Along with the paradigm shift there has been an emerging understanding of the need for flexible tenure arrangements, and the customary systems are therefore being reconsidered.

Exchange and market relations
Different exchange and market relations have existed as far back as the records show. First this consisted of simple barter of agricultural and pastoral products. Later trading routes enhanced the exchange between pastoralists and other societies. In the Sahara many of these traders were nomadic pastoralists. However, the most important change in recent times was the arrival of the colonial powers. The impact of colonialism was profound; although the pastoralists tried to adapt to the new situation it was difficult, because pastoralists were marginalised in most cases. The variable socio-political environment required flexible behavioural adaptations. It appears that involvement in the market economy can enhance pastoral production, although so far a polarisation of pastoral society has taken place.

General findings
This thesis has shown that the nomadic pastoral utilisation system is a cultural adaptation to a highly variable and unpredictable environment. Moreover, the system’s behavioural adaptive strategies have enabled it to cope with an unpredictable socio-political environment. It is appreciated that nomadic pastoralism is a viable utilisation system and will continue to be so in the future, as long as the following elements are ensured: flexible responses to uncertain events, mobility to allow optimal use of the heterogeneous environment and locally derived responses. This is not something new; similar things have been suggested in, for instance, Monod 1975, Galaty et al. 1981 and by Sandford 1983.

The point is that nomadic pastoralism is highly adaptive. Even though some of the areas can be utilised for agricultural purposes, they would only include a small part of the rangelands while the rest would be unusable for pastoralists because key resources are missing. Finally, it should be kept in mind that pastoralism in arid areas is a profitable way of producing protein for most African countries. However, the last remains to be proven.

8.2 The method
The vast amount of case studies and the small number of general textbooks on pastoralism have often surprised me. As it was not possible for me to conduct fieldwork and thus add to the number of case studies I therefore wanted to get an overview of the information on pastoral societies that was already collected. It turned out to be very difficult to get a clear overview of the material - this may explain the limited number of general textbooks. Most of the books claiming to provide an integrated study of pastoralism turn out to be collections of studies from different disciplines. The problem
with these is that they usually provide nothing more than a collection of articles found in different journals. It appears there is a need for general studies carried out by one person, applying the same approach to the investigation of different material. There are, however, a few books of this kind (e.g. ‘The Management of Pastoral Development in the Third World’ by Sandford (1983), ‘Customary Commerce’ by Kerven (1992)). These have been very useful for the present study due to their high degree of generalisation.

There are many disciplines studying nomadic pastoralism in one way or another. For this study, for instance, material from the following disciplines has been applied: archaeology, history, anthropology, geography, rangeland management, ecology, development studies, and probably more. Obviously, this hampers the possibilities of making general conclusions. Each discipline has a new approach, new definitions, and a new point of departure. The literature applied to chapter 4, for instance, is marked by lack of evidence, and hence dominated by theories, hypotheses, etc. The historical literature (applied to chapter 5) is likewise marked by lack of evidence. It is based on oral traditions, myths, and the first European accounts of Africa, and hence very heterogeneous. Generally, this leaves the reader with a very mixed impression of the systems and the actual events, the picture is sporadic and varied. The literature applied to chapter 6 and 7 (the present and the future) is inscribed by the paradigm shift. According to the old paradigm, nomadic pastoralism was a destructive utilisation system from which people could hardly make a living. The latter was emphasised after the droughts. According to most of the literature of this period, nomadic pastoralists were doomed to pauperisation. Hence, it has been important to try to distinguish the underlying paradigm and in a few cases even make a sampling on basis of this. However, it is difficult completely to avoid influences from the old paradigm, especially when applying results from many disciplines.

Many of the studies appear to be more interested in studying one group (case) in depth, than achieving some kind of general knowledge within one issue. Hence, the studies tend to be more ‘vertical’ than ‘horizontal’ in their approach. The explanation for the partiality for the study of one pastoral group may be found in the anthropological method: often the main tool for the anthropologist is field studies. The field study usually involves the anthropologist living and participating in another society; the results of the field study are interpreted and compared with other results, rather than used for generalisation. Furthermore, the interest of many anthropologists (and human geographers) is people, rather than production systems.

There are large variations in the results of the case studies. Moreover, the variations are not only significant from one group to the other, there are also great inter-annual variations within one group. The variations can often be explained by the inherent flexibility of nomadic pastoral strategies that can yield different results according to the changing conditions for production and life in general. Hence, many case studies are likely to provide nothing more than a snapshot. This means that one has to be careful when selecting as well as using the case studies. As far as the selection is concerned this should be representative. As mentioned this is difficult, and therefore a great number of cases have been chosen instead. This has been done in the hope of capturing the great differences between the cases. Likewise, it is important to keep in mind what the studies are used for, i.e. if they are used as examples or used for generalisations.
Finally it should briefly be mentioned how each of the disciplines has added to our understanding of the adaptation and viability of the nomadic pastoral utilisation system. The paradigm shift within ecology and economy has proven that nomadic pastoralism is a highly adaptive utilisation system with regard to resource management as well as to the social systems (tenure arrangements, systems of reciprocity, etc.). Archaeological findings have shown that nomadic pastoralism started as a cultural adaptation to a variable environment, while historical records have proved how important the surrounding society is. The geographical approach is valuable when the consequences of increased pressure on resources are evaluated; whereas anthropology provides an in-depth understanding of the pastoral groups and their behaviour. Hence, the interdisciplinary method has provided an ‘all-round’ view of the nomadic pastoral utilisation system and its adaptations.
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APPENDIX 1

Map showing the location of arid and semi-arid areas in Africa

Figure A.1 Arid and semi-arid areas in Africa (Bovin & Manger 1990 p.10)
APPENDIX 2

Terminology appendix

AGROPASTORALISM

The term agropastoralism is used to denote pastoral systems which are dominated by agricultural work. There are various definitions of agropastoralism, but usually they are based on the ratio between agricultural and pastoral products:

“A system in which more than 50% of gross revenue (the value of subsistence plus marketed production) or more than 20% of household food energy was directly derived from livestock or livestock-related activities was classified as a pastoral system. One which derived between 10 and 50% of gross revenue from livestock, in other words 50% or more from agriculture, was classed as an agropastoral system.”

(Wilson 1986 p.15, emphasis added)

However, most pastoral systems are not static systems, but rather constantly changing from one stage to another. Thus, a system might be characterised as agropastoral one year and not the next year. As argued in chapter 3, nothing much is gained from discrete classifications, and therefore in this context no specific definition of agropastoralism is used. The main difference between pastoralism and agropastoralism is that agriculture is a regular and recurring event in the agropastoral system, hence agropastoral systems tend to be more sedentary. Depending on the ethnic group, agropastoralists may consider themselves pastoralists or agriculturalists.

BUSH ENCROACHMENT

Bush encroachment is an increase in native shrub species, where increase can be understood either in terms of increase in density, increase in area, or increase in both density and area (Harrington et al. 1990).

Bush encroachment or ‘woody weeds’ is considered a problem and an indication of range degradation in some of the Africa rangelands, mainly in Botswana. In other parts of Africa the lack of woody species is considered an indication of degradation, for instance in the Sahel. Often it depends on the point of view. In Australia, some ranchers consider bush encroachment a sign of land regeneration, because the shrubs have made the soil more stable as well as lowered the temperature at the ground with the shade. Other ranchers see bush encroachment as negative, because the shrub often increases at the expense of perennial grasses, thus decreasing the productivity of the land in terms of forage production for the livestock. Ranchers supporting the latter point of view therefore call the increased amount of shrub for woody weeds. Hence, the discussion of bush encroachment is very complex.

COMMONS
'The commons' are not usually open to all. It is typically the local community that decides who can use the commons and how (The Ecologist 1992). Open access, on the other hand, is characterised by the absence of well-defined property rights, hence the access to the resources is free and open to everyone (Feeny et al. 1990). Thus, Hardin (1968) does not describe a commons regime, but an open access regime. Most African rangelands do not have open access, but rather common property regimes (Cousins 1993). According to Swallow (1990), the characteristics of common property can be summarised as follows:

- there is no single individual who has exclusive rights to the resources
- some kind of membership criteria exists
- the members expect that they can retain access to the resources
- communally defined guidelines for the use of the resources exist
- sanction mechanisms for punishing deviant behaviour exist

Not all of these characteristics may apply to African rangelands; especially the two latter points vary. Cousins (1993) claims that there is a continuum from common property as mentioned above to open access.

DEGRADATION

Like other environmental words the term degradation has normative connotations (Blaikie 1995). The term is meaningless without an explanation of the context (Livingstone 1991); actually, there is an emerging consensus among range ecologists and other people engaged in the range debate that the term degradation should be reserved for irreversible changes in ecosystems (Perrier 1990, Biot 1993). This means range degradation should denote management-induced changes causing permanent damage to an ecosystem’s processes and to its ability to regenerate itself. According to Queinoz (1993) land degradation can be regarded from two viewpoints:

- the ability of the land to produce a commodity
- the ability of the land to run the basic processes that permit an ecosystem to regenerate itself.

The range degradation concept has as a part of the ideas of rangeland dynamics also been influenced by the paradigm shift. The conventional approach, which was the basis for monitoring of range conditions in Australia and USA, built on the Clementsian model of vegetation succession. Within this approach certain vegetation types were considered to be signs of degradation, and thus not desirable. Within the new paradigm this has changed. Whether one vegetation type is more desirable than another depends on the management objectives, provided the basic ecosystem is not damaged, i.e. that the nutrient cycling and energy flow are still intact. Thus, the discussion of rangeland degradation is almost as widespread as the rangelands themselves.

DEVELOPMENT STAGE
Many researchers, especially geographers, have tried to divide various modes of human production and types of societies into groups that represent the stages of development - this term covers the same concept as “stages of social and economic evolution”, “stages of cultural development”, etc. As can be appreciated from the following, it has been discussed whether nomadic pastoralism should be conceived as a separate developmental stage. The German geographer Hans Bobek claims that nomadic pastoralism can not be conceived as an independent cultural stage but should be seen as ‘an ecologically conditioned offshoot of farming culture, and specifically of small-grain farming’ (Bobek 1962, p.228). In contrast to this Kant finds that nomadic pastoralists represent a certain type of community which is related to a certain level of subsistence economy as well as to a certain constellation of material, socio-political and religious traits, all of which are functionally linked (Kant 1962).

Some of controversy might be due to the discussion of whether human development has been linear or if one believes in a dual development. Dual development means that development of two stages can take place at the same time and there is more than one way of reaching a certain stage. Hence, all societies do not undergo the same development as they do not undergo the same stages.

EQUILIBRIUM ENVIRONMENTS

Equilibrium environments are those that show classic feedback mechanisms, where livestock populations are regulated in a density dependent manner. They are typically found in (relatively) humid areas with relatively predictable patterns of precipitation (compared to arid areas). One area can be dominated by equilibrium dynamics in years with high rainfall and by disequilibrium dynamics in low rainfall years (Scoones 1995).

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<td>Size of basic production unit</td>
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<td>Size of resource management unit</td>
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<td>Availability of technical innovations</td>
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<td>Need for external support</td>
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*Table A.1* Some differences between dry and wet pastoral environments (inspired by Swift 1995 p.156).

NOMADISM AND PASTORALISM

The word nomadism originates from Greek *nomas* and *nemein* which means ‘he who herds cattle’. This means the term originally included two concepts, both movement (herding) and keeping of livestock. Today, however, the term is often used only to describe movement, and thus nomadism and sedentarism have become antonyms. This is experienced both within fiction and within the sciences concerned with nomads in the original meaning. The English author Bruce Chatwin uses the term nomad extensively.
to describe migrating people, for example, the Australian Aborigines (see Chatwin 1987). Also among anthropologists hunters and collectors are called nomads (see for example Michaels 1987). Another example of the use of nomadism to imply movement is seen in the anthropologist Asta Olesen’s work on Afghan craftsmen (Olesen 1994). They are not sedentary and thus are called nomads.

The term pastoralist is used to denote people who are herders. However, there are many definitions of pastoralism:

“Pastoralists are people who derive most of their income or sustenance from keeping domestic livestock in conditions where most of the feed that their livestock eat is natural forage rather than cultivated fodders and pastures.” (Sandford 1983 p.1)

“Pastoralism may be defined as a human subsistence economy based wholly or partly upon domestic animals.” (Lamprey 1983 p.643)

Jacobs defines pastoralists as people who either raise livestock for consumption; raise livestock mainly for trade or social exchange; or do both (Jacobs 1965 p.146). Other definitions of pastoralists are:

“...people making their living wholly off their flocks without settling down to plant” (Kroeber in Jacobs 1965 p.145)

“...people who are chiefly dependent on their herds of domesticated stock for subsistence” (Krader in Jacobs 1965 p.145)

Where the former ties pastoralism to migration and lack of agricultural activities, the latter emphasises the dependence on livestock as the chief means of subsistence.

Some authors use either the term nomadism or pastoralism (for instance Perrier 1993, Bayer & Waters-Bayer 1993, Sylla 1993). It is appreciated that the two words both can describe livestock herding and that they sometimes are used at random (e.g. Saltzman 1981). In addition, pastoralism is sometimes used to denote livestock rearing without migrations. Other authors use a combination of the two terms; some use nomadic pastoralism and pastoral nomadism at random (e.g. Gilles & Gefu 1990, Farah 1996). Of those using either nomadic pastoralism or pastoral nomadism, the majority use the former (for instance English 1973, Bovin & Manger (eds.)1990, Mace 1993a).

OVERSTOCKING

The terms overstocking, overgrazing, and understocking are not applied in the present thesis. The reason is that there is no objective criteria whereby these can be measured as they depend on the management objectives. Hence, it does not make sense to speak about overstocking (Behnke & Scoones 1993). The overstocking controversy in Africa - as well as elsewhere - is well known. It illustrates how the problem was approached in the past from the point of view of researchers. It depended upon scientists who lived at a research station where they could carry out the measurements, but what they were to measure was mobile. Hence, the results did not reflect the local knowledge of the herders nor the space-time patterns of resource use (Blaikie 1995). Recent research has
shown that there is a weak response of plant production to heavy grazing (Hanan et al. 1991, Hiernaux 1996). However, changes in species composition in response to grazing are often similar to those in response to drought, which might explain the notion of ‘overgrazing’. Within the new paradigm the high variability is described as limiting the risk of exhausting the resources, and with special reference to Sahelian vegetation it ‘appears very resilient to natural and pastoral stresses’ (Hiernaux 1996 p.16).

RANGELAND MANAGEMENT

Rangeland management concepts were mainly developed within range-livestock production systems in USA, Australia, South Africa and Canada (Perrier 1990). These systems have some common features:

- the management goals are commercial meat and/or fibre production
- sheep and cattle are the main production animals
- the animals are controlled by fencing rather than herding
- usually the producer has exclusive grazing rights, whether the land is privately or publicly owned
- they are close to (well) developed infrastructure
- the producers are generally integrated in the political process concerning their needs
- the producers have a common Northern European cultural heritage

Hence, range management practices developed for e.g. Australian rangelands may be applicable to rangelands in USA. The general belief was that these management practices were applicable to the pastoral population in developing countries, because range management was regarded to be context independent. However, as Perrier (1990) has pointed out this is not the case.

STRATEGY

The term strategy can be defined in a number of ways. Some argue that a nomadic pastoral group applies a number of production strategies and others claim that there only is one utilisation system, which is the sum of all the actions within the production. In this context a strategy is defined as a selection of solutions. Attention is also given to Sandford’s definition: ‘strategies occupy an intermediate level between objectives and components’ (Sandford 1983 p.30). In other words, strategy is a pattern of behaviour.

TRANSHUMANCE

The term transhumance is used in many different ways by different researchers. Some of the researchers engaged in Sahelian pastoralism regard transhumance as being an extensive livestock production system, which combines seasonal migrations (with the herd) with permanent settlements in a suitable grazing area, often also with some agriculture (e.g. Groten 1988, Reenberg 1982). Some use it to describe the seasonal migration from lowland winter pastures to highland summer pastures seen in alpine Europe also named saeter drift. This is the original meaning of transhumance.
Transhumance is originally a French word meaning ‘a herder’s migration to mountains’, or it can be used as a verb *transhumancer*, meaning to migrate to mountains to graze (Sørensen 1984). According to Widstrand (1975) the term is now used to describe short seasonal migrations with the herd from the permanent homestead to permanent summer pastures or vice versa. Vertical summer migrations are not common in Africa’s arid and semi-arid areas, where it is rainfall and not temperature that causes seasonal migrations, and the term transhumance will therefore not be used. Moreover, it is unimportant for the thesis whether the migrations are horizontal or vertical.

**UTILISATION SYSTEM**

In the present context the term utilisation system includes the utilisation of the natural resources, production, the utilisation of products (e.g. for consumption, for sale), and the tenure of the resources utilised for production. This appears to be a wider concept than the commonly used production system, although some researchers might include all the aspects of the utilisation system in their definition of production system.

**VEGETATION SUCCESSION**

The idea of vegetation succession was initially developed at the turn of the century to explain variations in the vegetation types found in North America. From the 1920s to the 1940s the succession theory was transformed into a practical, applied technique for range management (Behnke & Scoones 1993). Especially Clement’s article from 1916 has served as a basis for the development of theories and techniques (Ellis 1995).

*Figure A.2* The Clementsian model of vegetation succession (Blumler 1996 p.32).
APPENDIX 3

List of abbreviations

ASS - Africa south of the Sahara
BC - before Christ
BP - before present
IIED - International Institute of Environment and Development
ODI - Overseas Development Institute