

# **Pastoral Nomadism in a Changing Environment**

## **Nomadismus in einer sich wandelnden Umwelt**

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### **1 Introduction**

There is a great variety of nomadic systems in parts of Africa, Asia and Europe. Though it is difficult to generalize, a distinction with respect to three broad types can be made. The first is full nomadism which involves the regular movement of whole families with their animals in search of pasture and water. There are no permanent homesteads, but traditional rights of exploitation over a certain territory. The second type is semi-nomadism where a part of the family is left in the home area engaged in agriculture. The third type is transhumance. This is a form of pastoralism practiced by sedentary cultures comprising agriculture and seasonal movements of herds.

The existence of nomadism is perceived as a problem by many Governments and development planners. In the Sudan e.g., plans have been worked out and schemes designed with the aim of settling nomads (1). One of the objectives was to make better use of existing resources by turning the activities to crop production and integrating nomads into the national money economy. This was often seen as a matter of greater urgency than that of the poor subsistence farmers, though the nomad's prosperity is often enough greater. Experience has been generally negative. Low yields and unsatisfactory surpluses of crop production have to be weighed against losses of livestock which used to be kept on the large tracts of marginal lands which cannot be used otherwise but by pastoral nomadism. Nomadism in its various forms has to be assessed as a well organized system of land use and a rational adaptation of human life to the environment. However, it is most sensitive to ecological changes and loss of grazing

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grounds. This paper intends to discuss some of the factors which cause a gradual fading away of existing nomadic systems under conditions of changing environments.

## **2 The Predominant Role of the Environment**

The rangeland livestock production system comprises ecological factors concerning the physical environment, biotic factors like fertility, mortality or resistance of the animal populations, and cultural factors determined by inherited values, attitudes or knowledge of groups and tribes. The latter two factors are determined by the first through an agelong process of adaptation and selection. Hence, ecological conditions have to be seen as the decisive element of the entire system. They comprise factors like seasonal rainfall, periodic droughts, flora and fauna, vegetational growth cycles, and availability of water.

The total area used by a nomadic society consists of a number of grazing grounds the exploitation of which accords with the seasonal sequence of rainfall, availability of surface or ground water and vegetational growth. In the Northern Guinea Zone of West Africa two forms of transhumance can be observed (2). The Fulani of Northern Benin, e.g. pursue a southward movement beginning in November and complete their return in May. This pattern which is normally referred to as the great transhumance is characteristic of a zone with one distinct rainy season (May/June – Sept./Oct.). In Central Benin there is a sequence of long (April – June) and short (Sept./Oct.) rainy periods. Here, a combination of great and small transhumance is practiced. The animals are kept near the homesteads during the two rainy seasons. They move to nearby lowlands in the short dry spell and spend the long dry season in distant areas, particularly on the banks of the great rivers (e.g. Niger).

Cunnicon (5) reports that the Humr of the Sudan perform migrations to four major regions throughout the year, two of which involve movements of a few days, another one of a fortnight, and the remaining one up to a month. In addition there is a great number of minor shifts within each grazing ground. The areas are by no means homogeneous but sites may differ with respect to quality of fodder due to distinct vegetation and soil types. Shifts normally serve specific purposes like, escaping from harmful insects, finding specific fodder plants for calves, exploiting rainwater pools, or avoiding mud underfoot.

A distinct dry and wet period is the feature of all zones and an equally distinct period of plant growth coincides with the wet period. Wet season grazing areas are the vast arid savannah woodlands and semi desert which allow some vegetation to grow during the rains and which are subject to extensive burning every year. If nomadic herds are compelled to graze these areas longer than the carrying capacity allows the inevitable result is overgrazing, irreversible destruction of the vegetation, soil erosion and finally desertification.

The dry season is the crucial period in nomadism. The ability to maintain a herd during this time constitutes the most important skill of a nomadic herdsman. This period is the labour peak during which life may become extremely hard. This may be increased with the incidence of a periodic drought. Dry season grazing grounds may be situated in lowlands or on the banks of the great rivers where water is available on or immediately under the surface. Areas of higher rainfall like the Nuba Mountains in the Sudan, are dry season grazing grounds because of extremely unhealthy conditions during the wet period. Growing competition for dry season grazing and water put additional stress to the nomads life which may very often result in increased aggressiveness (6). This state of affairs is expressed by a nomads statement: "Wandering in the rains is pleasant whereas wandering in the dry season is hardship" (6).

### **3 The Loss of Grazing Areas and its Implications**

The nomadic rangeland production system is primarily based on the periodic use of different areas varying in quality and seasonal availability of fodder and water. Each of these areas cannot be used permanently throughout the year. Security of survival of the herds is depending on the availability and accessibility of all grazing grounds belonging to the system. Consequently, the loss of only one of the areas will result in a disruption of the system and faulty use or overgrazing of the remainder.

In the course of population growth there is an ever increasing demand for land. Expansion of agriculture into the marginal areas is a common feature today. Rainfed agriculture extends into the lowlands, and irrigation schemes are developed along the great rivers as well as in small valleys. These areas were traditionally dry season grazing grounds of nomadic herders and, as such, vital elements for the survival of stock. They are the first ones to be lost for nomadism when agriculture is expanding in the course of population growth and economic development. They are turned to crop production often of extremely low intensity.

In the Usambara Mountains of Tanzania cattle are traditionally kept by the resident cultivating Shambaa and additionally by some nomading tribes. The animals formally grazed on the slopes and hill tops during the rains and found sufficient fodder in the valley bottoms in the dry season. In the course of population growth more and more of the slopes were cleared for cropping. But more important, the valley bottoms were drained and turned to agricultural use, in particular to vegetable production in the dry season. In the course of this development cattle were confined to steep slopes and hill tops throughout the year. Overstocking and dry season grazing on these areas caused heavy erosion which contributed further to the loss of resources. Consequently, cattle had to be abandoned completely in many parts of the mountains (3).

Consequences of the establishment of one of the earliest irrigation schemes of the

modern era, the Gezira Scheme in the 1920's are reported by Abdel Ghaffer (1). The occupation of the banks of the White Nile by sedentary cultivators led to increasing competition and conflicts among the pastoral tribes depending on these areas for dry season grazing. In addition existing water points became inaccessible and cattle tracks used for long distance movements had to be diverted into areas where water was unavailable. The total area of rich black cotton soil of about five million acres between the Blue Nile and the White Nile was mostly inhabited by nomadic and semi nomadic tribes before 1923. With the irrigation of about two million acres of land under the Gezira and Managil Extension Scheme the population of nomads in that area dropped from 90% to 7% (1).

Further loss of resources was caused by the process of modernization of crop production. The Rafa'a al Hoi used to cultivate small fields of dura which covered their needs besides milk. They used to rent the land from sedentary farmers on the banks of the Blue Nile. With the increase of mechanized cultivation schemes in the later 50's they had to abandon cultivation and hence, these income opportunities were lost (1). They since depend on barter or purchase for their supplies of dura. As a consequence of the current development described above, a vicious chain of events may finally put an end to nomadism. From two sides the system is constantly losing ground. Agricultural development encroaches into the dry season areas. This again accelerates the process of soil erosion and desertification. Consequently, the common saying becomes true: "The nomad is not so much the son of the desert, but rather its father".

#### **4 The Search for Solutions**

There have been numerous attempts to find solutions to existing problems of nomadism through innovations or systems change. However, experience has very often been negative, due to the extreme sensibility of nomadism to any alteration of prevailing parameters. As opposed to cropping systems there are limited opportunities to intensify land use or to adjust to changing conditions.

Isolated innovations like the construction of additional water points or veterinary service, though generally welcomed by the nomads, very often imply destructive side effects. New wells and reservoirs may be assessed as improvements if they enable herders to utilize an area which could not be grazed to its full capacity before, due to shortage of drinking water. In other cases, however, additional water supplies will cause serious overgrazing. Effective veterinary services disrupt the natural fertility-mortality balance, and lead to overstocking, unless higher off-take rates can be affected at the same time. These are, however, linked to changing attitudes as well as to the development of markets.

In the past, improvements have mainly been achieved by utilization of the natural process of selection. Still today nomads are highly interested to improve their livestock and

the system seems to leave some room for this. On the other hand it is important to note that behavioral patterns of nomadic societies allow little scope for improvement or perpetual use of the available grazing resources. Long distance migratory drives were common through history, when nomadic societies had completed destruction of their natural resources by faulty use and unchecked herd growth. On the other hand there are examples of traditional systems which were able to maintain the available range resources. They were based, in principle, on periodic rest periods and controlled use. Their objective was to take the best advantage of a desirable pasture without destroying it and to establish grazing reserves for the dry season. The Hema system used in the Near East since ancient times involved rules and regulations established by the users (7). In some of these grazing was restricted to a specific number of animals and specific days for limited hours. In others, it could only be hand harvested by women on certain days. A similar system in Ethiopia specified hand cutting on a rotation basis, and during every second cut only certain grasses could be harvested. In every seventh year the reserve could be cut for hay or grazed (7).

Another example of a traditional grazing system capable of preserving the range may be quoted from the Adamaoua Plateau in the Cameroons. Here, the nomading Bororo of the Fulbe tribes used their wet season grounds traditionally in fixed cycles. They grazed the range for two, three or even up to six seasons after which they left it to rest for three to four years. This traditional scheme, in combination with controlled burning permitted the highly valued grasses (*Hyparrhenia*, *Andropogon*) to regenerate their reserves and hence, a stable plant population was maintained over a long period (8).

Traditional grazing systems were primarily based on strict social control and have since deteriorated in the process of socio-economic change. The hema system in Syria has been abandoned during the past 60 years due to governmental programmes which have declared range lands as public property open to grazing for all. The system practiced by the Fulbe and Bororo in the Adamaoua's has been hampered by the establishment of national boundaries restricting free movement of herds. However, the most drastic hazard occurred with the rapid advance of the *Glossina* (Tsetse) fly in the past 30 years which forced herders to abandon large parts of the region. The resultant phenomenon is overstocking of remaining range lands, increased competition, and discontinuation of traditional practices. The immediate effects are visualized by the destruction of the plant population and soil erosion.

## **5 The Path Towards Modernisation**

It has been mentioned above that nomadic systems are extremely sensitive to change. Emerging problems can neither be solved by isolated innovations, nor by enforced sedentarisation of whole groups. This, however, does not mean that change is incompatible with nomadic societies.

Sedentarisation of nomads has been a common phenomenon throughout history in particular when nomadic societies conquered new areas where conditions allowed permanent settlement, or even urban development. West African Fulbe, e.g. have undergone this kind of development. This kind of sedentarisation, however, which is linked to a different environment and which may result in occupations of urban life has to be viewed as a normal adaptation to changing conditions. Schemes in which nomads have been compelled to settled life have generally been failures. They often resulted in a complete loss of herds. The population concerned had to exchange a self-sufficient economy, though of a low standard, with that of a farmer producing below subsistence level.

On the other hand, an ongoing process of sedentarisation of nomadic societies can be observed in many parts of the world. This process should be looked at as an autonomous development path influenced by socio-economic, socio-political, and ecological factors. In any case, economic development of nomadic tribes and the land they use is likely to set an end to the nomadic way of life. An example of this development path and the problems involved may be quoted from the Beni Hassan of the Highlands of Jordan (4).

The Beni Hassan have a nomadic background herding large flocks of sheep and goats. Parts of the tribe have settled in the Highlands about one generation ago in order to participate in the economic development of the nation. They have constructed villages and adopted a semi-nomadic way of life. They move their flocks east in springtime for browsing in the semi-desert. In late summer they move west to feed their animals on the remains from the cropped land in the agricultural zones. Their villages lie between both areas. Here they maintain natural pastures on a quasi individual right of ownership on which they keep their flocks during winter.

The system has deteriorated, since. In the semi-desert opportunities for browsing decreased, due to overstocking. Free movement into the agricultural areas became more and more restricted with the ongoing development of tree crop plantations. In addition, national schemes of reforestation limited the available public grazing grounds. In compensation for fodder shortage on the overgrazed home pastures the villages cultivated cereals in order to complement the feed with straw and grain. The cultivation of unsuitable areas, however, accelerated the process of soil erosion and environmental destruction. Under the present state of affairs many villages are faced with two alternatives: either to completely give up animal husbandry or to change to a stationary system. Both steps are equally likewise painful.

A technically feasible system of stationary husbandry and perpetual use of the available home pastures is offered by development planners and projects. It principally involves a rotation of pastures with a rest period once in four years, the planting of fodder

shrubs, a drastic reduction of the cropped area, and the construction of soil erosion control measures. The new system allows, after some years, to maintain the whole flock on the available home pasture for the entire year, and even to improve the present level of nutrition.

The new system is certainly economic and ecologically sound. However, the time span involved until benefits become effective, causes the principle problem. After the change of the system there is a serious fodder shortage for two or three years. This shortage is caused by the decreased production of grain and straw, the need to turn a fourth of pasture to rest, and by the fact that the newly planted shrubs cannot be browsed for two years. The serious fodder shortage can be easily foreseen by the herders and is the main reason why many of them hesitate to take the risk of a systems change. As the fodder shortage has to be bridged by the purchase of grain, the main problem is that of liquidity rather than profitability.

While the reasons for the decay of practiced systems are to a great deal external, there are internal factors which limit the ability of herders to change their system. The risks involved are the higher, the further the process of environmental destruction and impoverishment has developed. While better knowledge and motivation may be required to initiate a change of an outdated system, material assistance to overcome the liquidity problem is vital for the immediate survival of the flocks and the population concerned.

## **6 Summary**

Nomadic systems in their various forms are depending on the periodic use of different areas of distinct quality. They are extremely sensitive to environmental change, and in particular to the loss of one or several grazing grounds belonging to the system. In the course of agricultural development cropping systems gradually encroach areas formerly used by nomads. Rainfed agriculture and irrigation schemes occupy primarily traditional dry season grazing reserves of the pastoralists. Consequently, they are forced to keep their livestock on the remaining areas longer than the carrying capacity permits. The resultant phenomenon is overgrazing. The immediate effects of soil erosion and desertification are again causes for the loss of grazing areas. If this vicious course of events continues, it will finally put an end to the existence of nomadic systems.

There are numerous attempts to find solutions to existing problems. Isolated innovations however, very often have negative side effects. The experience of enforced sedentarisation is likewise generally negative. On the other hand there are autonomous developments of sedentarisation under specific conditions. Here, however, pastoralists require assistance in order to decrease risks and overcome constraints which accompany a systems change.

## Zusammenfassung

Nomadische Systeme in ihren unterschiedlichen Ausprägungen bedingen die periodische Nutzung verschiedener qualitativ unterschiedlicher Areale. Sie erweisen sich als äußerst empfindlich gegenüber ökologischen Veränderungen und insbesondere gegenüber einem Verlust von Weideflächen, die Teile des Systems sind. Im Zuge landwirtschaftlicher Entwicklung besetzt der Ackerbau zunehmend Flächen, die vormals durch Nomaden genutzt wurden. Regenfeldbau und Bewässerungswirtschaft okkupieren vorrangig die traditionellen Trockenzeitweiden der Viehhalter. Diese sind folglich gezwungen, die Regenzeitweiden über die Tragfähigkeit hinaus zu beanspruchen. Überweidung, Bodenerosion und schließlich Desertifikation sind die unmittelbaren Folgen, die schließlich zum Verlust der Weideflächen führen. Solange diese Kausalkette besteht, wird das Ende nomadischer Systeme nicht abzuwenden sein. Zahlreiche Lösungsansätze versuchen der Problematik zu begegnen. Generell gilt, daß isoliert eingeführte Neuerungen in der Regel ungünstige Nebenwirkungen haben. Ebenso erfolglos waren meist Maßnahmen der zwangsweisen Seßhaftmachung. Auf der anderen Seite gibt es Beispiele autonomer Prozesse der Seßhaftwerdung unter besonderen Bedingungen. Hier kann dann Hilfestellung sinnvoll sein, um Risiken zu vermindern und Engpässe zu überwinden, die mit einem Systemwandel verbunden sind.

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