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**Pastoralists and Planners:
Local knowledge and Resource
Management in Gidan Magajia
Grazing Reserve, Northern Nigeria**

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I am most grateful to the Scandinavian Institute of African Studies for support and for commending my leave of absence during 1987-1988 to conduct fieldwork among the Fulani of Gidan Magajia grazing reserve, Kwara State in Northern Nigeria. While in Nigeria, I enjoyed the assistance of numerous Nigerian colleagues and friends at Ahmadu Bello University in Zaria. My gratitudes go to Prof. Moses Awogbade who inspired my work with so many ideas. Mallam Umaru A. Hassan of the National Livestock Projects Department assisted me during the entire four months fieldwork. I could have not had a better field partner than Mallam Umaru; a Fulani scholar interested in studying his own people. I gained a lot of knowledge from him and Mallam Abubakar and his family. I also received gracious assistance from Dr. Jerome O. Gefu who assisted me to get access to some material at the library of the National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Zaria. Dr. E. C. Agishi of the Department of Pasture Agronomy supplied me with invaluable material on forage resources, the nutritional value of Savannah grass and harvest residues. Mallam Umaru A. Hassan and Mallam Abubakar helped me to collect vernacular names of various plants. Many other people, informants, colleagues and acquaintances assisted in this study whose names cannot be mentioned here. However, all shortcomings and mishaps are my sole responsibility.

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1. INTRODUCTION: FULANI PASTORALISM UNDER CHANGE

The Fulani constitute the largest pastoral group in the West African Sahel and like other sectors of the population, they have been subjected to drought, famine, economic pressures, political turmoils and pastoral development failures. As a result, many Fulani moved southward and settled with their herds in the sub-humid zone to evade the vulnerability of the Sahel. Since the sub-humid zone is already populated by peasants and agro-pastoralists, competition between these two systems of land use and resource management practices increased, with serious impacts of ecology and society. The situation is aggravated by the introduction of large scale mechanized agricultural schemes under the River Basin Development Authority which have appropriated vast areas for cash crop production.

This paper deals with a small section of the Fulani who migrated from Sokoto state in Northern Nigeria during the drought of 1972/1973 and settled in Borgu District of Kwara state in the buffer zone between Guinea savannah and the sub-humid zone. It intends to assess the interaction between Fulani pastoralists and the various agents of change and their ability to adapt themselves to the new career patterns emanating from the recent processes of socio-economic and ecological change. My prime interest is to examine the conflicts between the objectives of pastoral production, on one hand, and pastoral development projects, on the other.

The Fulani (also called Fulbe) pastoralists inhabit the West African Sahel and northern parts of the northern frontiers of the sub-humid zone. Historical sources indicate that the Fulani originated in the lowlands of the Senegal River from which they migrated, during the 13th century, to Northern Nigeria and Chad. Today, they can be found in Northern and Central Nigeria, Cameroon, Chad, Senegal, Niger, Mali, Mauritania, Burkina Faso and other Sahelian countries including the Sudan.

The population census of 1963 estimated that there were 4.784 million Fulani in Nigeria (8.6 % of the total population), but this number fluctuates. The Fulani combine crop and animal production and are also integrated into the modern sector as traders, workers, agricultural labourers, etc. Most of the Fulani pastoralists began in late 1950s to adopt shorter migratory patterns instead of long-distance migration. Others established seasonal or temporary settlements in the sub-humid zone (Okaiyeto, 1982, Awogbade, 1983, Waters-Bayer, 1988). Recent statistics estimate that about

40 to 50% are semi-settled and that those who still practice pure nomadism are about 20 % (Green Revolution, 1981) with the remainder being settled Fulani.

The Fulani still possess the largest share of the livestock population in Nigeria (ILCA, 1979). Bayer et al (1987) estimate that 80 to 90 % of the total cattle population in Nigeria is kept by Fulani pastoralists. Furthermore, the composition of Nigeria's cattle herds consist of 76.5 % of traditional breeds which were domesticated by Fulani pastoralists. These are White Fulani (51%), Red Fulani (14%) and Sokoto Gudali (11.5%). It is also worthwhile mentioning that Livestock contribute about 5 % of the GDP i.e. 27.4 % of the share of the whole agricultural sector in the GDP in Nigeria.

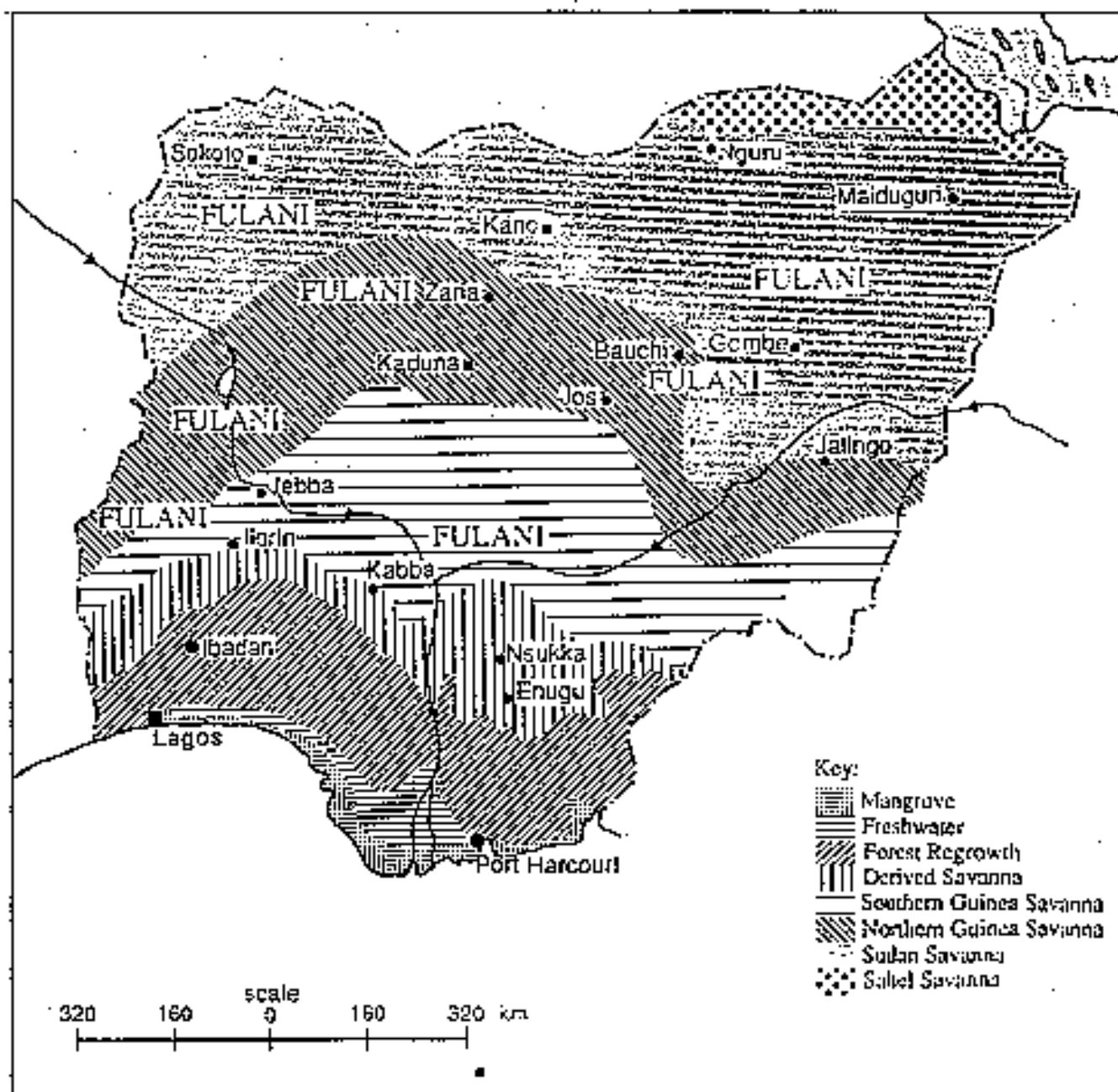
The Fulani inhabit various ecological zones, have different systems of herd management, allocation of labour and the utilization of natural resources (Map 1). Their traditional patterns of adaptation are described by several authors (Stenning, 1957, 1959; Hopen, 1958; 1964; Frantz, 1973; Fricke, 1979; Awogbade, 1980, 1983; Water-Bayer *et al* 1987; Waters-Bayer, 1988). These include:

- 1) the great skill and diligence with which herds are deployed so as to exploit water and pasture supplies and to avoid disease;
- 2) the rudimentary control of stocking which is allowed to take place in order to ensure calving throughout the year;
- 3) the rarity of systematic culling, which when practiced at all, is based on a standard of excellence referring to colour and conformation rather than to milk production, and
- 4) the proclivity for in-breeding and line-breeding to avoid disease and to maintain aesthetic standards (Stenning 1959).

These features of pastoral Fulani cattle husbandry are associated finally with a general unwillingness to part with stock by slaughter or sale. Despite the many changes which have taken place in Fulani society and economy, the above characteristics still play an important role in their practice of animal husbandry. However, the Fulani have begun to sell more animals on the modern market. According to Frantz (1978: 346), "increasing involvement in networks of relations with townsmen and sedentary farmers has not only

expanded their market for dairy products but also brought greater diversification and improvement in their diet and health, more involvement in the market economy, greater dependence on others for labour and essential household needs and changes in systems of marriage and lineage based authority". These changes have exerted new demands on the individual households and their herds. First, the Fulani households have to satisfy an increasing need for manufactured goods and other services. Second, they have to secure higher livestock productivity, despite long spells of drought, in order to meet these demands. Hence the recent socio-economic and ecological crises have obliged the Fulani to modify their traditional husbandry practices to cope with these changes.

Governmental policies and plans designed to settle or to 'develop' the Fulani were implemented under unfavorable economic and climatic conditions which, coupled with poor planning, have led to profound failures in pastoral development efforts. These policies have led some scholars to view the outcome of pastoral development ventures in Nigeria as a disaster rather than a blessing, as will be shown later.



Map 1: The distribution of the Fulani in various ecological zones in Nigeria

2. SOCIO-ECONOMIC CHANGE AND RESOURCE MANAGEMENT

Fulani pastoralists have played an important role in the history of many West African states; such as the Sokoto Caliphate (Northern Nigeria), the Futa Jallon State (present-day Guinea) and the Liptaako Emirate (Northern Burkina Faso). The advent of colonialism and its accompanying administrative and economic structures has also left its marks on Fulani society. Such forces of change include the following:

The commercialization of pastoral production

This is by no means a new phenomenon among the Fulani. It dates back to centuries of interaction with the Hausa, the Tuareg and the Berber in their migration in the West African states of Niger, Mali and Northern Nigeria. Baier (1980: 149) states that, with "the arrival of the Fulbe in Hausaland in the 15th century or earlier, the possibility of a marketable surplus in cattle was greatly expanded. Nomadic Fulani lived primarily on milk from their herds and on grain they obtained in exchange for animals and animal products. The completion of the railway to Kano in 1911 offered a solution to the difficult transport requirements of the cattle and kola traders".

Commercialisation continued with further improvements in transport; and an increasing use of cash due to the introduction of head-tax (*Jaraji*) and cattle tax (*Jangali*) by the British colonial administration (Awogbade, 1983: 79-80). The introduction of manufactured goods and the proliferation of local trade also induced further entanglement with the market economy. Watts (1983) argues that the commercialization of pastoral production among the Fulani has resulted in their impoverishment and an increasing demand on cattle not only to maintain the household but also to provide for the extra demands exerted by the colonial or national states. Taxation and market integration mean that the Fulani pastoralists have been burdened by the exploitative nature of the state, cattle traders and the middlemen who dominated livestock trade. Watts (1987: 194) concludes that, "the possibility of herd decapitalization has been a major incentive for herders to take up cultivation of grains to circumvent the market altogether while other nomads are quite literally forced out of the pastoral economy by unequal exchange, having to liquidate all their animal assets. The cultural premium placed on the pastoral genre de vie has naturally been a major incentive for

herders to retain their classical cattle-based mode of operation. Accordingly large herd size is a rational adaptive response to the vicissitudes of the market and the climate".

Many Fulani began to adopt an agro-pastoral mode of livelihood, because it meant they could survive better in the event of drought or epidemics. The need for large herds has arisen due to climatic unpredictability and the continuous increase in the prices of grain and other imported goods and services relative to livestock prices. These socio-economic processes have forced some impoverished pastoralists out of the pastoral economy, while the more fortunate ones have settled with their cattle and became agro-pastoralists. Changes in resource management followed since more land is needed first, to cater for a growing number of livestock and human populations and second, to increase food production for both. Ecological degradation due to the concentration of livestock and over-cultivation has been the consequence of this process.

Ecological change

Ecological degradation in Northern Nigeria has been recorded in official reports since the early 1930s. Watts (1983, 1987) asserts that there were scanty, though unreliable, reports about famine which was precipitated by a long spell of drought in 1914. The rinderpest epidemic and drought of 1948 has also been documented. The recent famines and spells of drought 1972/1974 and 1983/1984 have been recorded in Derrik (1977, 1984) and Apeldoorn (1981). Drought and famine have impressed themselves on the Fulani and other sections of the population in Northern Nigeria. They resulted in massive population migration from the savannah to the subhumid zone, with Fulani pastoralists increasingly forced to adapt and look for new possibilities for survival.

The case of the Gidan Mígajía grazing reserve is one example of such population movements as a result of recent climatic disasters since the 1960s.

The establishment of the grazing reserves

Grazing reserves were first proposed as a means of pastoral development during the colonial regime in the late 1940s. The idea was initiated by the International Bank for Development and Reconstruction (IBRD) and was carried out by a FAO supported programme in 1953. The reasons behind the demarcation of the grazing reserves have been given by several authors; (Hopen, 1958; Awogbade, 1980; Waters-Bayer *et al.*, 1987). By 1985, 24,281,438 hectares of land were acquired and demarcated as grazing reserves, but not gazetted - in the northern states. The main objective behind the establishment of the grazing reserves would seem to be a noble one. The pastoral Fulani have suffered increasing pressure on land due to a high population growth (3.5 % per annum in a population of over a 100 million) as well as subsequent drought and food shortages in the northern drylands. The grazing reserves are conceived by Nigerian planners as one of the appropriate policy measures to settle the Fulani pastoralists in areas where livestock services could be rendered and crop production could be introduced to supplement household income while agricultural residues could provide fodder for the herd. The main feature of this policy is its adoption of crop/livestock integration. An intensive interaction with the market economy is envisaged to increase off-take while securing a reliable supply of better quality livestock and livestock products to satisfy an increasing demand created by the high growth rate of the rural and urban population.

The grazing reserves policy has been designed with the assumptions that:

- a) the land tenure system in Nigeria is such that the Fulani have no legal rights to their traditional grazing lands. The grazing reserves provide the Fulani with legal rights to land;
- b) without protecting pastoral land, Nigeria will lose a valuable resource in the form of meat and milk which would otherwise have to be imported;
- c) the establishment of the grazing reserves aims at attacking ecological stress by providing permanent pasture, water points and units for disease and epidemic control.

The advocates of the grazing reserves (eg. FAO, 1980; ILCA, 1979, 1986), argue that the present systems of herd management are a waste of labour

and valuable land resources. Hence the settlement of the Fulani pastoralists in grazing reserves is expected to alleviate pressure on land and to make available vast stretches of cultivable lands for the production of food crops. The settled pastoralists can easily be provided with water, education, medical facilities and livestock services. A strong association has been made between social development and settlement.

Opponents of the grazing reserves (eg. Awogbade, 1982; Okaiyeto, 1982; Gefu, 1986) argue that the traditional systems of pastoral production are well suited to the savanna ecology within which the Fulani live. The Fulani pastoralists have developed, through years of experience, a very efficient system of pastoral production, and it is claimed that social development services could be provided while the pastoralists are on the move.

The opponents of the grazing reserves hold the view that livestock concentration in limited reserves will lead to overstocking, overgrazing and overcultivation because both human population and livestock are concentrated in smaller areas all year round.

Modern dairy production attempts

There have been substantial efforts to develop modern dairy production systems among Fulani pastoralists (Waters-Bayer, 1988). Three phases of the development of dairy production can be traced. First, during the late 1920s milk processing factories were introduced in Northern Nigeria. Another milk processing unit was introduced in Kano in 1940. These two attempts proved to be profitable by producing sufficient butter for the local market and a reasonable surplus for export. Second, during the 1950s and 1960s a decline in milk and butter production in Nigeria and a rapid rise in imports were witnessed. Third, from the mid-1970s, under the Third National Development Plan, 10 factories were established for reconstituting imported powdered milk. This marked a policy shift from encouraging local production to massive imports of dairy products. This period also saw the establishment of smallholder dairy schemes for Fulani pastoralists aimed at collecting and processing milk, for sale to the urban dwellers. However, these schemes were not successful.

"The planners themselves were not agreed on development aims. While dairy specialists were planning to collect surplus milk from the pastoral herds, beef specialists were planning to increase production of slaughter cattle. The Fulani's own goals (eg. milk consumption, securing subsistence); and the goals specifically of the women who sold the milk (eg. achieving a more or less steady income despite fluctuating milk yields) were disregarded in the development model" Waters-Bayer (1988:35).

The activities of the River Basin Development Authority.

Major mechanised agricultural projects are located at Kano River, Sokoto-Rima and Chad River basin and are considered by the Nigerian government as central to food production (Ekekwe 1985). Large-scale rain-fed mechanized schemes were also initiated in the states of Kaduna, Bauchi and Sokoto and were to be extended to about 18 states by the end of the 1980s. These agricultural projects are located in states with high human and livestock population density. They can, therefore, be considered among the agents of change which have left serious impacts on the subsistence activities of the Fulani pastoralists. As a recent study confirms, "no significant services were provided to the pastoral Fulbe by the River Basin Authority since its establishment 13 years ago. Instead, the pastoral Fulbe are suffering increasing alienation from land and water resources, increasing conflict with farmers, emergence of new cattle diseases and/or increase in the existing cattle diseases" (Hassan, 1987:161).

Such findings are not new, as shown by a study of the impact of the River Basin activities on the Fulani published nearly twenty years ago by Udo (1970: 12-3) who commented that, "the mechanized schemes were expanded at the expense of the Fulani pastures, and it had thus created conflicts between the pastoralists and the cultivators".

3. TRANSFORMATION OF RESOURCE MANAGEMENT IN GIDAN MAGAJIA GRAZING RESERVE

Like other pastoralists, the Fulani command vast knowledge about their environment and have developed an elaborate system of resource management. Adjustments in the social organization of production to cope with new demands on land and labour for agricultural and animal production, are necessary and take different forms according to resource availability, landed property rights and other socio-economic and technical considerations. Knowledge of the soils, the seasons, vegetation cover and species is important for survival. The organization of production and the spacing out of activities are linked with the formation of collective labour groups capable of carrying out the productive activities without sacrificing one production system for the other. In this section, I intend to show that knowledge of edible plants and browsing trees reduces pressure on cultivable land and pasture by diversifying the sources of human and animal livelihood. Resource management here is given a wider meaning to encompass activities within and outside the modern economy. This approach illustrates that the survival of the Fulani is intimately linked with the rhythm of the seasons and the natural reproduction of the plants and other living species. Any large-scale interference with this system may undermine a valuable source of subsistence without compensating for it by modern interventions. The case of Gidan Magajia grazing reserve is used to demonstrate this point.

Gidan Magajia grazing reserve

Gidan Magajia grazing reserve is located in Borgu District, Kwara state, Northern Nigeria (see Map 2). When compared with other parts of Nigeria, the area around the reserve is relatively underdeveloped with fewer schools, poor health services and no tarred roads.

The total population of Borgu District is estimated at 149,787, occupying a territory of about 27,400 square kilometres. The majority of the population are Borgu while the Fulani constitute only 2% of the total population of the District. This small percentage of the Fulani is due to their recent immigration to the area and their continuous movement to and from Borgu District. The Borgu are efficient cultivators and a few of them keep small ruminants. Those who keep cattle and have adopted the Fulani

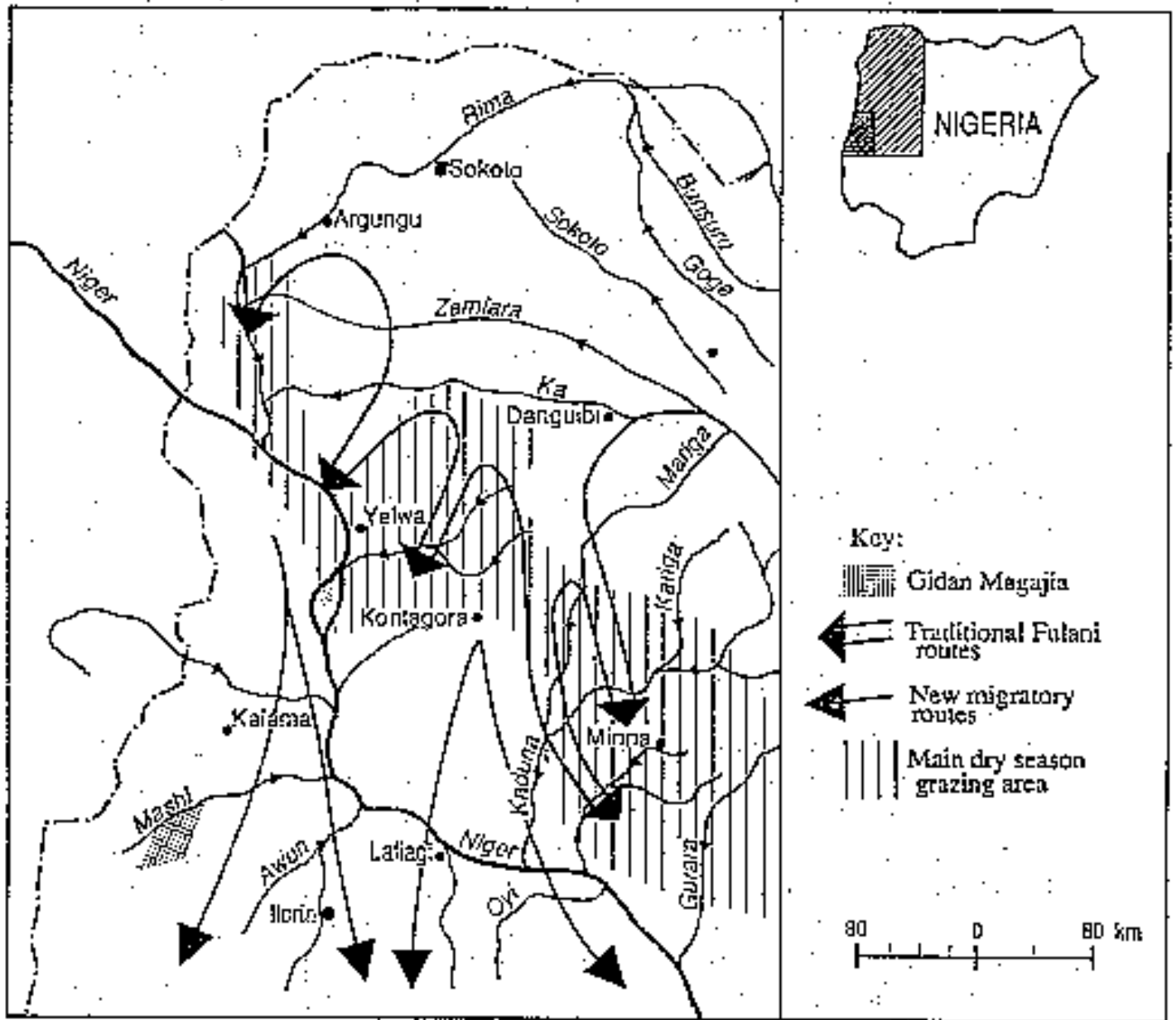
way of life are called **Borgu-Fulani** which indicates a connection between ethnic identity and occupation.

Borgu District is located in the buffer zone between the subhumid zone in the Southern and Northern Guinea Savannah, and the Sudan Savannah in the North, Map 2. This territory receives between 800 to 1200 mm of rain per annum with a north-south gradation. The northern fringes bordering with Sokoto State sometimes receive less than 400 mm of rains annually. The rains fluctuate from one year to another as well as during the beginning and the end of the rainy season. As a result, the area is sometimes inundated with migrant ethnic groups from the more vulnerable northern drylands.

Although the soils adjacent to the rivers provide better forage during the dry season, these are infested with the tsetse fly which causes trypanosomiasis. The Fulani resort to the river banks and valleys only during the peak of the dry season, when the flies are considerably reduced. The soils are also very heavy when wet, causing foot diseases if the herd is kept in them for a long period of time during the rainy season. This unfavorable situation for the herd increases the demand for labour and requires co-operation between kinsmen and neighbours to keep their cattle away from the heavy soils and to dig the weak ones out of the mud when they are stuck.

Settlement and conflicts over land

The Fulani settlement in Gidan Magajia grazing reserve coincided with the 1972/1974 drought which forced them to extend their southward dry season migration from Sokoto state into the subhumid zone. Map 2 shows that the area which was demarcated for the grazing reserve is a natural extension of the routes which they traditionally used during the drought. Borgu local chiefs were first approached by government officials prior to the establishment of the grazing reserve. The chiefs then contacted the local population and informed them about the government decision to establish a grazing reserve in the vicinity of their village. The area chosen was demarcated and Borgu farmers who claimed the ownership of some parts of the land were discouraged from cultivating inside the reserve. Despite these instructions, some farmers continued cultivating their old farms. Others cleared new farming plots for expansion or as part of the traditional rotation system.



Map 2: Gidan Magajia grazing reserve and the migratory routes

The early years of the establishment of the reserve witnessed conflicts over land between the Fulani pastoralists and the Borgu farmers. Eventually a system began to emerge whereby the incoming Fulani solicited the consent of the local chiefs before they finally settled in the grazing reserve. Traditionally, the Fulani did not possess any rights over the grazing land outside their permanent settlements, except for immediate use or usufruct rights. However, the reserve is officially designed and legally gazetted to encourage the Fulani to settle. The present lack of resource pressure in Borgu District has prevented land conflicts from developing into major crises or ethnic disputes. The settled Fulani do not cultivate large plots or keep their animals in one area throughout the year; their movement from one place to another makes them less of a threat to Borgu farmers. Some Borgu farmers still fear that the Fulani might one day settle permanently and demand legal rights over their land.

Local knowledge and natural resource use

The Fulani command a deep knowledge of the natural resources and have elaborate descriptions of various plant and animal species and their uses. Plants are usually classified according to sex (male/female), edibility (edible, non-edible or poisonous), whether domestic or wild, season of reproduction etc. Natural resources are considered gifts from God, and whoever misuses them will be subjected to God's anger and punishment. Hence, the Fulani conceive of natural disasters as acts of God instigated by man's mishandling of the gifts of nature. Social misconduct, injustice and lack of harmony between kinsmen and neighbours are all believed to be linked with natural disasters such as drought and rinderpest. Many Fulani herders attribute the recent drought as a sign of society's greed and unashamed ego-centrism.

Local knowledge about seasonal variations in rain and pasture is of prime importance since social relations and livelihoods are dependent on the natural sequence of the environment. Despite the construction of modern animal feed factories and bore holes, the Fulani are still dependent on free range grazing supplemented with crop residues and they depend on the rains for drinking water for themselves and their animals for almost eight months of the year.

Although all Fulani speak the Fulfulde language, their classifications of the seasons differ according to the ecological zone in which they live. For example, the Fulani of Gidan Magajia grazing reserve distinguish six main seasons. These are shown below:

Season	Description	Duration
<i>Dabbol</i>	Early dry season	December-January
<i>Seedu</i>	Mid-dry season	February-March
<i>Korsol</i>	Early rainy season	March
<i>Shetto</i>	Before mid-wet season	April-May
<i>Ndungu</i>	Mid-wet season	June-September
<i>Nyamnde</i>	Early dry season	October-November

Generally, the Fulani divide the year into *ndungu*, wet season and *seedu* (or *cheedu*), dry season to mark the transition from one set of activities to another. *Ndungu* is associated with cultivation when less time is devoted to intensive watering and herding activities. However, this season is also associated with another type of difficulties and risks such as the prevalence of the tsetse fly, Foot and Mouth Diseases (FMD) and worm infections. During *ndungu*, the soil under foot could also be a source of hazard, and weak animals may find it difficult to pull themselves out of the mud. Since more co-operation is needed in this season, neighbours and kinsmen herd their animals together so that labour can be devoted agricultural activities.

Seedu, the dry season, is associated with intensive herding activities. Considerable effort and time of households, kinsmen and neighbours or even hired labourers are mobilized in herd management. The main activities in this season involve the digging of new wells, redigging the old ones and a continuous movement from one place to another in search of pasture.

The pastoral Fulani collect various types of edible plant species during the dry and the rainy seasons, many of which are shown in Table 1. These plants provide a very important part of their diet, and they are the main source of vitamins when the herd is grazed away from the village (see Table 2). Cattle also depend on browsing trees and the need for such fodder becomes more urgent as the dry season progresses and the grass cover is depleted. During this season, the Fulani depend on the use of crop residues such as guinea corn and groundnuts, but these farm by-products do not last for a long period.

Although the Fulani knowledge about plant species has been accumulated over centuries, it is unfortunate that the younger generations are losing this knowledge. The situation is even worse when it comes to knowledge about medical plants. The Fulani themselves remark that there are, today, fewer traditional medicine-men who can accurately diagnose and treat animal diseases. Table 3 shows some of the plants which are still widely collected and used in the treatment of different animal diseases.

Table 1: Edible Plants and Parts Used by the Fulani of Gidan Magajia Grazing Reserve

Fulfulde	Latin	Parts used
<i>Alluki</i>	***	Gum
<i>Barkehi</i>	<i>Detarium microcarpum</i> & <i>d. senegalense</i>	Fruits Fruits
<i>Bummehi</i>	<i>T. glaucescens</i> & <i>t. laxiflora</i>	Fruits
<i>Butaye</i>	<i>Kookiya strychnos spinoso</i>	Fruits
<i>Chambulli</i>	<i>Ximentia americana</i>	Flowers
<i>Dingali</i>	<i>Gardenia sokotensis</i> & <i>gardenia squalla</i>	Fruits
<i>Kahi</i>	***	Barks
	<i>Dichrostachys cinerea</i> & <i>dioscorea</i>	
<i>Ka'rehi</i>	<i>Butyospermum paradoxum</i>	Fruits/oil
<i>Knokehi</i>	<i>Detarium microcarpum</i> & <i>d. senegalense</i>	Fruits
<i>Kuriyahi</i>	<i>Bombax buanoeozence</i>	Flowers
<i>Narehi</i>	<i>Parkia clappertoniana</i>	Flowers
<i>Pa'aohi</i>	***	Fruits
<i>Tane</i>	<i>Balanites aegyptiaca</i> & <i>cayjanuscajan</i>	Fruits/oil

(*** Latin name not identified)

Table 2: Browsing trees and the Parts Used by Fulani Herds

Fulfulde	Latin	Parts browsed
Alluki	***	Leaves
Alali	<i>Ximenia americana</i>	Leaves
Banoje	<i>Pterocarpus erinaceus</i>	Leaves
Barkehi	<i>Detarium microcarpum</i> and <i>d. senegalense</i>	Leaves Fruits
Bodi	<i>Terminalia avicennioides</i> ,	Leaves
Bunnehi	<i>T. glaucescens</i> & <i>t. laxiflora</i>	Leaves
Bunnehi-badi	<i>Vitex boniaria</i> <i>Vitex simplicifolia</i>	Leaves Leaves
Burle	***	Leaves and fruits
Buski	<i>Combretum vigerianus</i>	Leaves
Butuje	<i>Strychnos spinoso</i>	Fruits
Chambulli	<i>Ximenia americana</i>	
Cilikolohi	<i>Amylonocarpus andogensis</i> and <i>Burkea africana</i>	Leaves
Dandi	***	Leaves
Dingali	<i>Gardenia sokotensis</i> & <i>Gardenia squalla</i>	Leaves and fruits
Kahi	***	Leaves
Jaruji	<i>Coclospermum paradox</i>	Leaves
Jaiame	<i>Tamarindus indica</i> , <i>Dichrostachys cinerea</i> and <i>dioscorea</i>	Leaves
Ka'rehi	<i>Butyospermum paradoxum</i>	Fruits
Kawohi	***	Leaves
Kayarlahi	<i>Phoenix dactylifera</i>	Leaves
Kisni	<i>Bridelia ferruginea</i> <i>amygonocarpus</i>	Leaves Leaves
Kohi	<i>Prosopis africana</i>	Leaves and fruits
Knokehi	<i>Detarium microcarpum</i> and <i>D. senegalense</i>	Fruits
Kuriyahi	<i>Bombax huanoenezense</i>	Fruits
Malgahi	<i>Cassia arereh balanites</i>	Leaves, Fruits and flowers
Nelbe	<i>Diospyros dactylifera</i>	Fruits
Narehi	<i>Parkia clappertoniana</i>	Leaves
Pa'aohi	***	Fruits
Shambi	***	Leaves
Tane	<i>Balanites aegyptiaca</i> and <i>cayjanuscajan</i>	Leaves
Yillorohi	***	Leaves

(*** Latin name not identified)

The Fulani knowledge of their environment transcends technical notions such as carrying capacity and links ecology with cosmology and religious values. Land and its products are carefully utilized as a source of food, pasture, and medicine to cure human beings and animals from various types of diseases. Prayers for rain or *salati el istisga* are often administered during drought. The Fulani widely hold the view that any misuse of the trees, water and grass would induce droughts and epidemics, and alienate human beings and animals from the gifts of nature. It is, therefore, only for a very good reason that a Fulani would cut down a tree. The only justifiable reasons for cutting down a tree include fencing, browsing, house building, and for making beds and wooden tools. Firewood is always collected from dead trees, and charcoal making was, until recently, not known to Fulani herders. It is only with the growth of towns and urban centres that the impoverished Fulani began to cut down trees for charcoal making. The Fulani still ridicule those who earn their living from wood selling or charcoal making.

Land use, access and rights

Regardless of the state's declared policy of land acquisition in favour of the Fulani, some elements of the traditional land tenure system are still prevalent, even within the grazing reserves, mediated by the government officials, who attempt to negotiate a peaceful settlement of disputes with the Borgu peasants. As the original owners of the land in which the grazing reserve is established, the Borgu have an overriding role in land distribution. As a result, no new settlers can afford to antagonize them.

The grazing reserves have offered the Fulani some security over land in the face of the accelerating expansion of large-scale mechanized farming. However, there is great future uncertainty with regard to permanent rights over the grazing reserves.

Land resources available to Fulani pastoralists are dwindling at an alarming rate. It is suggested by Okaiyeto (1982: 443-4) that, "there is a constant pressure on the pastoralists, especially in the *fadama*, valleys and lowlands, which constitute 17 % of the area of Nigeria and the best grazing lands available for the Fulani during the dry season". The development of the River Basins Development Schemes and Agricultural Development Projects in these areas have aggravated the situation.

Table 3: Some Medicinal Plant Species for Treatment of Animal Diseases

Fulfulde	Latin	Parts used and application
<i>Bakkurehi</i>	***	An extra growth of a tree dried, pounded, mixed with salt and used to speed up delivery.
<i>Bodi</i>	<i>Terimalia avicennioides</i> <i>t. glaucescens</i> & <i>t. laxiflora</i>	Barks- pounded and powder mixed with salt and used to treat habitual abortion (Brucellosis)
<i>Bokki</i>	<i>Cucumis pustulatus</i>	Barks- dried, pounded and powder mixed with salt and given to cows to speed up labour and relieve delivery pains
<i>Burle</i>	<i>Dichrostachys cinerea</i>	Seeds- soaked in water and given to calves to treat worms, goli (haemonchosis).
<i>Hanolu</i>	***	Barks- soaked in water and given to calves to treat worms
<i>Kahi- Katki</i>	<i>Aristolochia albida</i>	Barks- soaked in water and given to calves to treat worms, goli
<i>Konkeht</i>	***	Same as above
<i>Hanohi</i>	***	Same as above
<i>Narehi</i>	<i>Parkia clappertoniana</i>	Same as above
<i>Naudi</i>	<i>Bridelia ferruginea</i>	Barks- pounded, soaked in water and salt and used to treat poisoning

(*** Latin name not identified)

Pastoralists and farmers displaced by the large-scale mechanized agricultural schemes tend to find their way to relatively less populated areas. The reserve has recently witnessed the immigration of many Hausa communities (about 15 settlements, each with a population of 30-40 households), driven from their traditional homelands in northern Nigeria by the combined impacts of drought and population pressure and the expansion of irrigated agriculture. Land tenure issues are destined to be amongst the most difficult problems to confront grazing reserves such as Gidan Magajia in the future.

The Fulani have been quick to recognize that the state policies favour crop production and that land rights are more easily granted to farmers than pastoralists. Fulani pastoralists began to be involved in crop production which they thought would eventually give them access to land rights. In this

way, changes in land use and in sources of subsistence may precipitate identity change, since the values enshrined in one production system are not the same for another. For example, the use of cattle as a capital reserve, status symbol and a source of sustenance has different cultural meanings from accumulation of grain which is considered among some farming communities a sign of meanness and a lack of solidarity with the group.

4. PRODUCTION AND LOCAL LEVEL RESOURCE MANAGEMENT

The Fulani attitude towards their herds has changed tremendously during the last few decades. This is mainly because they have to increase off-take in response to new consumption patterns. Any claim which portrays the Fulani as a group of pastoralists who are largely dependent on milk for their diet is no longer valid. On the contrary, there is a steady trend towards the commercialization of milk and milk products with less milk consumed by the household. Cattle are no longer just reserve capital, as they are exchanged as an economic asset consciously used to meet the *increasingly expensive household needs*. These changes in behaviour and attitude towards cattle ownership have a far-reaching effect on herd management practices.

The Fulani have drawn closer to urban centres, the market economy, modern goods and services and governmental institutions. They are dependent on towns and service centres for the sale of their livestock and livestock products while the state apparatus is waiting to collect taxes and service charges. Whether their systems of production would continue to be viable amidst increasing ecological, economic and political pressures is open to question.

Four aspects of the organization of production and local level system of resource management in Gidan Magajia grazing reserve are described below: herd management, crop production, labour cooperation and veterinary practice, and how modern change is affecting pastoral practice.

Herd Management

The Fulani traditionally keep cattle breeds which according to veterinary scientists (Okorie, 1977: 70-4) " are very hardy, have greater tolerance to heat, humidity and diseases such as trypanosomiasis than the exotic breeds. They possess the ability to convert coarse grasses, forages and other feeds into milk, and still provide excellent meat in their old age. They can withstand stress and can travel longer distances with little or no water".

Herd management, in the case of the Fulani, depends largely on a careful utilization of their indigenous cattle breeds and the wealth of local knowledge which they have accumulated about their reproduction properties and diseases. Transhumance was, until recently, the most dominant type of herd management. However, what is important is not to classify the Fulani as nomads, semi-nomads, agro-pastoralists and cultivators, but to explore how these various practices have adapted to changes in ecology and the market economy.

The mean herd size in Gidan Magajia grazing reserve is 23 head of cattle per household, with about 70 % breeding cows and heifers, which suggests a tendency towards selling males and keeping females to reproduce. The average household size - based on our 1988 data - was 3.2 which was relatively smaller than the 7 persons per household reported by Hopen (1958: 63) and Awogbade (1983: 27). This could be attributed to the fact that the Fulani of Gidan Magajia migrated in smaller groups with a relatively small herd size which does not require a large labour input and that herd size is not suited to the maintenance of large households. The Fulani of Gidan Magajia grazing reserve are the survivors of two droughts (1972/1975 and 1982/1985), from which their herds have not fully recovered.

The Fulani are very conscious of maintaining a balance between the proportion of the milk used for household consumption or sale, on the one hand, and what is left for the calves, on the other. The calves are allowed to suckle the colostrum for the first 4 to 5 days. Weaning is not controlled and the calves continue to suckle until their mothers become pregnant again by which time they begin to feed on grasses. Calves are cared for by youngsters who bring them branches of browse to feed from during the dry season and when pasture is in shortage. The calves may also be left to graze around the settlement if the water sources (wells or rivers) are far away. In this case, water is brought to the calves by women and young

girls. Due to the long absence of their mothers, such calves are left to suckle their mothers for a while upon the latter's return from grazing and before they are milked in the evening.

The daily routine begins between five and six in the morning. Milking and the release of the calves is done by women. The cattle graze all the way to the well. During the dry season, water is drawn by men from deep wells that are 4 to 5 metres deep. Watering begins as early as 12 noon during the dry season and as late as 3 pm during the rainy season. The Fulani explain this by the fact that it is very hot and dry during *seedu* (or the peak of the dry season) and that is why they water cattle earlier. During the wet season, cattle can wait until late in the afternoon because the climate is very humid and the grass is very moist, which means that the animals can withstand thirst for a longer period of time. The Fulani water their animals from the wells up to the beginning of May when the rainy season starts to gain momentum. From there on the herd drinks from water pools throughout the rainy season. New wells are usually dug towards the end of the rainy season, mostly in late November.

The Fulani are increasingly aware of the importance of adopting a flexible herd management system to release some labour for agricultural activities. There is also the need for less labour intensive herding activities by keeping herds closer to the settlement and looked after by children while the energies of youth are invested in crop production.

Crop production

Crop production is practised by all Fulani households who settled in the grazing reserve. Each household cultivates an average of 4 hectares of land, in which they plant guinea corn, maize, yam, cassava and a variety of minor crops such as groundnuts, okra, cow beans and squashes. Most of the settled Fulani produce surplus grain which they sell on the market to finance immediate needs such as oil, sugar, onion, salt, soap, medicines, clothes and shoes.

Labour is essential for crop and livestock production, and usually *households with many members (anything more than 7 in this case)* cultivate larger plots. Some Fulani compensate for a shortage of household labour by hiring herders to look after their animals or to work their fields.

Farming is considered a male activity, but in desperate situations, women also participate, particularly in weeding and harvesting which are the most labour intensive operations. Harvesting is carried out jointly, and women collect the crops and carry them to the threshing arena, after men have cut and piled them in large heaps. Men thresh while women winnow and also carry the crops to the village. Granary building and crop storage are handled by men. The Fulani explanation of why they do not allow their women to participate in all agricultural activities, is that women have much to do at home, especially with milk processing, house keeping and child rearing. Others reply that their women are not used to farming and will bring shame to the husband since his parents in-law may interpret it as a sign of poverty and that their daughter has to work to feed herself. Thus, the Fulani invite the work of their wives only in very desperate situations, when there are no other sources of farm labour available.

The Fulani of Gidan Magajia have adopted the Borgu agricultural techniques, rotation system and agricultural equipment. As shown earlier, the Fulani divide the year into six seasons with a clear understanding of the overlap between animal husbandry and crop production. The Borgu, on the other hand, divide the year into four seasons: *tonburu* (early rainy season which extends from March to June), *wuburu* (the peak of the rainy season which begins in June) and *kpuru* (the dry season which continues from December to March) and *sonsanreu* (the peak of the dry season from March to early June). It is important for the Fulani to know the Borgu names for the different seasons because they are more suited to agricultural activities than their own calendar, which is more suited to pastoral production. The second reason is that the Fulani have only a short experience with the climate of the subhumid zone as they have moved only recently.

Farm equipment made by Borgu blacksmiths differ in shape and performance from those traditionally used by the Fulani. Now the Fulani have taken up the *jumbere* (axe used for cutting trees and branches), *jallow* (shovel used for making ridges), *johnorde* (hoe fixed in a long wood used for yam digging and *tanyirde* (sickle used for cutting guinea corn). All these farm equipments are locally made by Borgu blacksmiths.

The Fulani have also adopted the Borgu's dominant rotation system, shown below:

Table 5: Borgu crop rotation system

First year	Cassava	Guinea corn	Maize	Yam
Second year	Cassava	Yam	Maize	Maize and guinea corn
Third year guinea corn	Cassava	Maize and	Maize	Yam
Fourth year	Cassava	Yam	Maize	Maize and guinea corn

Crops are usually cultivated separately in the first cropping year, while cassava and maize are grown separately in the same plots for at least four years depending on soil fertility. Maize and guinea corn are always grown in plots where yam was previously grown and vice versa. It is interesting that while the Borgu adopt different rotation systems, drawing from their long farming experience in the sub-humid zone, the Fulani seem to employ a rigid rotation system, and most of them follow the same pattern which they acquired in their first contact with the Borgu. There were several anecdotes told by Borgu farmers about Fulani farming practices such as cultivating some crops in the wrong type of soil or using a weeding method which involves more labour than if they used the Borgu weeding methods. There is also the contradiction between the Borgu's interest in burning the vegetation cover in order to minimize weeding and the Fulani interest in using grass as a fodder for their animals.

However, it seems that through the exchange of indigenous knowledge, the Fulani continue to improve their skills by adopting the Borgu's elaborate agricultural calendar and practices.

There are several linkages between agricultural and pastoral production in Gidan Magajia grazing reserve. Animals usually feed on maize, guinea corn and groundnut residues. Groundnut residues are stored to be used during the dry season while yam and cassava peels are fed to cattle and small ruminants, mainly goats and sheep. Crop residues can still be obtained freely from Borgu farmers because some Borgu, who have little knowledge of and time for animal husbandry, trust the Fulani to manage cattle on their behalf. In this case, the Fulani use the milk and receive one out of every four calves born to every Borgu cow entrusted to them.

Another linkage between agriculture and livestock production is the use of manure to maintain farm fertility. The Fulani, as a rule, keep their animals in the fields after harvesting to consume the crop residues which also means that the manure can be applied immediately. The second method used is to collect the manure and spread it over the fields a few weeks before the rainy season commences. There is also the possibility of getting some manure from Fulani cattle which pass through the grazing reserve during the dry season.

The Fulani adopted this agro-pastoral system of production in order to be able to diversify their income in the face of drought. Most households produce their own grain and there is no pressing need to sell large numbers of animals to finance immediate needs. The agro-pastoral system of production is labour intensive and requires co-operation between large numbers of people to carry out the many activities in which they are engaged.

The spontaneous getting together of Fulani pastoralists and Borgu farmers, despite confrontations over land ownership, is an achievement from which modern development planning institutions have much to learn.

Co-operation in agro-pastoral production.

The Fulani of the Gidan Magajia grazing reserve subsist mainly on agriculture, pastoral production and collecting various fruits, roots and leaves. They are better described as agro-pastoral in which the organization of production requires a careful utilization of labour in more than one sphere. The division of the season into labour intensive herding and watering activities during the dry season, and labour intensive agricultural activities such as weeding and harvesting during the rainy season, offers a partial solution to the problem of labour allocation. Co-operation between kinsmen and neighbours constitutes the second means of alleviating bottle-necks emanating from shortage of labour. Although the family constitutes the basic unit of production and consumption, its members maintain close ties within the same settlement. Co-operation between such groups is normally invoked to execute herd watering, attending agricultural activities, house building, well digging and the protection of their herds against predators and cattle thieves.

The Fulani co-operate with each other without calculating how much labour each participant household has received. It seems almost like the principle "from each according to the surplus labour available to his household i.e. having a small herd and a large household size, and to each according to his needs i.e. having a large herd, but a small household size". This system does not indicate any notion of egalitarianism, but emphasizes inequality in wealth and the availability of surplus labour which can be circulated among the members of the same settlement. The Fulani of Gidan Magajia grazing reserve do not hire their labour to other Fulani within their settlement. If a household has a pressing need for additional labour (knowing that it has to wait for some time before its turn to invite the members of the settlement to assist in weeding or harvesting is due) it can hire Borgu or other non-Fulani labourers. The remote possibility of hiring a Fulani is due to the fact that the Fulani think that the acceptance of cash payment from a member of the same settlement is an admission of social distance and the lack of good will.

The changes in pastoral production outlined earlier have also influenced the Fulani social organization of production. In his study of the pastoral Fulani of Western Borno, Stenning (1959: 5) wrote that "although dispersed for most of the year, the clan, like the agnatic group is a unit of co-operation with regard to cattle and labour". However, the present situation shows that the Fulani clans are widely dispersed. People move in smaller groups with the aim of using the grazing lands closer to their settlements. Drought has reduced the vegetation cover and it has become very difficult for large herds to move together. Hence, some clans have already abandoned their so-called traditional homelands and have moved into new areas, not collectively, but as groups of individual households.

The households in Gidan Magajia belong to various clans and form small groups who are increasingly losing contact with their relatives in Sokoto State. It is also impossible for them to co-operate with clan members who are hundreds of miles away. Contrary to claims that cattle are owned by lineages, the herd is now owned by individuals and households, and the head of the household has absolute authority to dispose of his herd in any manner he wishes. Many Fulani still glorify the ownership of large herd size as a safeguard against drought and epidemics. This view supports Frantz (1978) and his argument that, "the Fulani cattle are increasingly owned by individuals or families rather than by lineage or clan". This signals the fact that some aspects of traditional solidarity have begun to

erode due to the processes of change which are taking place among the Fulani.

There are also signs of change in the division of labour among women, with more women involved in the marketing of milk and milk products. Waters-Bayer (1988) has observed the emergence of new career patterns among Fulani women. She (*ibid.* :89) points out that, "among women, minor income generating activities include petty trade in commodities such as kerosine, palm oil or salt. Handicrafts such as mat making, crocheting, knitting and embroidery are generally practiced for personal use and rarely for sale". Women have become the major contributors to household income but this has not been reflected in increasing women's participation in decision-making with respect to herd disposal or the political arena.

In short, the Fulani maintain close co-operation to handle livestock and agricultural production activities. However, there are signs that wage labour will soon replace the present pattern of labour exchange since more pastoralists are losing their herds. As long as pastoralism is the only occupation that they know best, it is likely that they will hire out their labour to the wealthy pastoralists. This process has already begun among other Fulani with longer experience of a sedentary way of life. The agents of change will, therefore, force the Fulani into new career patterns in order to diversify their income base and reduce the risk of depending on only one activity. The development of the present agro-pastoral system is only one example of Fulani flexibility in the face of change.

Treatment of animal diseases

The Fulani have vast knowledge about various types of medicinal plants, their properties and curative uses. Nigerian scholars (Sojowora, 1982; Nwude and Ibrahim, 1980; Ibrahim *et al.*, 1986; Obianwu, 1984; Ibrahim, 1983 and 1991) and others recognize the value of Fulani indigenous knowledge and the need to develop it.

The Fulani, likewise, have detailed knowledge about the curative plants in their surroundings. For example, Table 3 above shows the main plant species which the Fulani use for the treatment of certain animal diseases. However, Ibrahim (1986:193) warns that, "presently, ethno-veterinary information is collected and interpreted freely without conformity to any established standards. This situation is further confounded by the fact that

the vernacular names of diseases and of plants vary widely amongst different settlements even in the same geographical area, as well as among other dialects or ethnic groups". This investigation is not free from the above shortcomings which have been highlighted by Ibrahim (*ibid*). However, this information is put forward here to emphasize that: a) there is good indigenous knowledge about diseases and their treatment among the Fulani, b) there is a need to forge closer co-operation between social and natural scientists and pastoral medicinemen in order to understand the uses and abuses of their treatment methods and the effectiveness of the medicine they use.

The Fulani experience with modern veterinary services dates back to the colonial period when vaccination campaigns and limited animal health services were introduced. Various Nigerian Governments have also tried to introduce such services among the Fulani, who are gradually beginning to see the benefits of modern medicine in the treatment of diseases and epidemics which ravaged their animals in the past. Nevertheless, the Fulani still adhere to some of their own traditional practices in the treatment of animals. Many of them still prefer to use their own medicines before they take their animals to be treated at veterinary hospitals and clinics. The interest in traditional medicine has lately been reinforced by shortages and the high cost of modern medicine.

Due to their lack of confidence in the modern input delivery system, a new category of veterinary personnel outside the official channels has begun to emerge. The unofficial "veterinary nurses" usually get access to modern medicine from veterinary drug stores in towns or by illegal means from veterinary hospitals. The pastoralists prefer them to the veterinary personnel employed by the government because the unofficial veterinary nurse travels quickly to animal camps using his motor cycles or local transport. Official personnel may take days before they attend the diseased animals, and there were several complaints, by the Fulani, about the slow response and indifferent attitude of the veterinary staff. The unofficial veterinary nurses render their services to pastoralists on a commercial basis. They receive their payment immediately after they have attended the herd and are usually presented with gifts if the animals are cured.

The emergence of a number of veterinary nurses operating outside the official channels is a clear indication that the Fulani pastoralists accept innovation and attempt to avoid the bureaucratic strings imposed by the official administrative structure.

5. MODERN RESOURCE MANAGEMENT INSTITUTIONS AS A CULTURAL SYSTEM

In this section, an attempt is made to discuss the changes outlined earlier and discuss conflicts of perception and culture. There is, on the one hand, the modern planning culture geared towards the modernization of livestock industry through the introduction of imported technology and institutions. On the other hand, the Fulani culture aims at satisfying the subsistence needs of the household. Whereas the modern institutions depend heavily on imported technology, knowledge and infrastructure, the Fulani system of resource management is based on local knowledge, with very little use of modern inputs in the form of medicines and vaccines.

The contradiction between the two cultures of pastoral production are compounded by an interest gap between the pastoralists and the planners. The planners are educated and trained to appreciate modern techniques of production with little or no interest in Fulani cultural factors of production. These contradictions also relate to the planners' perception of the methods capable of developing the livestock industry, which are often incompatible with the Fulani perception of resource management and organization of production.

This case illustrates that planners and pastoralists hang on to priorities which are defined independent of each other's objectives, which thus prompts contradictions in goals and their implementation. Livestock development planning from the late 1970s and the early 1980s has shifted the emphasis from provision of services for the grazing reserves, to the establishment of private dairy farms. Planners have once more referred to imported cultural practices to develop dairy production. Exotic cattle breeds such as Friesians, Guernseys and Jerseys were imported from Europe, loans were extended to the private sector and research institutions and dairy farms were demarcated. It is obvious that the modern system of dairy production requires the importation of a whole industrial complex such as livestock feed mills, milking equipment, machinery for silage making, laboratories, expatriates, etc. By 1981 a number of animal feed mills were established with a total capacity of 600 thousand tons, and there was a mushrooming of commercial veterinary pharmacies to cater for the demands of the private dairy farms. A few years later the feed mills confronted the usual story of capacity under-utilization, spare part problems due to hard currency rationing and shortage of raw materials (Mohamed Salih: 1990 a).

In general, the modern system of resource management has not proved to be the solution to the problems confronting the livestock industry in Nigeria. The exotic imported cows encountered some serious problems and there were reports suggesting that, apart from the high cost of imported inputs, the performance of the imported dairy cattle, even under the best management practices with intensive health care, has been low (Mohamed Salih: *ibid*).

While the planners continued to import exotic breeds, the settled Fulani of Gidan Magajia were busy introducing new traditional breeds to minimize the high loss of animals which they encountered during the first years of their settlement in the subhumid zone as their herds encountered different diseases, insects and natural hazards. The Fulani introduced Ketuku cattle which have a high resistance to disease and insects and cross-bred them with Sokoto Gudali and White Fulani with positive results. Some households reported that their herds began to pick up and in a few years they could compensate for the losses which they had incurred during the previous years.

Another point of interest is the manner in which planners perceive agriculture and livestock production as separate activities designed in isolation from each other. According to Okaiyeto (1982:529), the River Basins Development Authorities and the Agricultural Development Projects concentrated only on crop production until 1978/1979. This focus suggests that most of the Fulani traditional grazing lands are being transformed into arable lands. The end result of this ill-conceived policy as Okaiyeto (*ibid*) puts it is that, "the Fulani would then become marginal farmers at the best, and at the worst, landless labourers working for the governing, bureaucratic and other elites".

However, the issue is not one of a simple loss of land from one sector of agricultural production to the other or conflicts over landed resources. It is a complete loss of a valuable source of livelihood and an increasing inability to utilize the traditional methods of herd management and the handling of natural crises such as drought.

Bridging the gap between two cultures of resource management

The Fulani response to change is impressive despite considerable difficulties resulting from immense ecological and economic pressures. This is not to deny that the Fulani have suffered adverse changes in social organization of production, herd management systems and the acceptance of new career patterns. Two processes seem to have shaped the new patterns of adaptation: first, micro-responses related to tapping indigenous knowledge at times of crisis (collecting of edible wild plants, cross-breeding of cattle breeds to reduce susceptibility to diseases, use of traditional medicine for animals and the mobilization of labour within and outside pastoral production); and second, at the macro-level, responses to increasing impoverishment (immigration to the subhumid zone, increase in the prices of manufactured goods relative to those of cattle and milk, loss of land to mechanized schemes and large-scale farming as well as the state policies which favour agricultural production). At both levels, the Fulani have to accommodate to new situations with great difficulty. While wealthy households have the ability to diversify their incomes, poor households are increasingly marginalized with grave consequences such as accepting to work as wage labour in agriculture or as paid herders, migration to towns and centres of employment. Many impoverished Fulani have joined the pool of the urban poor in towns such as Sokoto, Kano, Kaduna and Zaria. Even in town, they have to adapt to a new culture in which their pastoral experience is of scanty, if any, relevance. With no skills to secure them jobs, the Fulani migrants are amongst the poorest in towns of Northern Nigeria.

Pastoral development is impossible without due consideration to socio-cultural practices and the manner in which they respond to change. It is naive to think that Fulani knowledge alone is a sufficient prescription for development; there is also the need for new knowledge. This can be useful in advancing standards of living through the improvement of health, education, water supply and an increase in animal productivity. The Fulani are very responsive to useful interventions as the case of the informal veterinary medicinemen illustrates. There is, now and more than ever before, the need to develop contact points between planners and pastoralists, and seriously to consider the integration of pastoral and agricultural production, the use of browsing trees to supplement seasonal deficiencies in pasture and the utilization of traditional veterinary medicine and indigenous knowledge to supplement modern veterinary practices.

One way of realizing a bottom-up approach as has been suggested by Toulmin (1991:28) is to move away from physical planning and assessment of carrying capacities and to rely more heavily on local knowledge and institutions to manage natural resources. Top-down planning tends to impose one cultural tradition on the other, rather than creating contact points between the two.

CONCLUSIONS

Two important policy implications can be drawn from the relationship between the Fulani pastoralists and planners. First, national resource management and planning strategies can no longer afford to treat pastoralists as a separate and remote sector of the economy. Agricultural development introduces new activities which require new arrangements to accommodate them. Since productive resources, in most areas, are already under pressure from diverse users and interest groups, it is important to balance demands of existing and new activities. Problems of resource management relate not only to physical planning and efficient deployment of modern input delivery systems, but also include the local communities and their readiness to accommodate change.

Second, newly introduced production systems have the potential of creating competition over resources, especially if they aggravate conflicts of interest between different resource users. For instance, the introduction of private dairy farms and large scale mechanized schemes in the buffer zone between the dry and the sub-humid zone has seriously damaged pastoral production. Hence, planning objectives may contradict societal interests and survival mechanisms.

The culture in which the planners have grounded their approach to pastoral development is based on certain attitudes towards Fulani traditional practices. Planners demand that the Fulani pastoralists have to change their attitudes, but planners and administrators must also be more flexible and curb their in-built resistance to what they have not learned in the class room. Chambers (1974:148) was probably right in commenting, in a different context, that, "the damage done [to third world researchers and planners] by the inappropriate training of the developed world is probably irreversible". Livestock development specialists, like some of their

counter-parts in agricultural economies, "have been trained away from being able to see professional or prestigious those simple operations which are most needed". This trend is receding, albeit in a very slow pace.

Success by the Fulani in acquiring new skills in crop production, cattle breeding and adjustment to the more complex environment of the sub-humid zone, is a clear indication that people can adapt circumstances to suit their felt needs. They do not require planners to initiate such changes. The success of any project cannot be guaranteed unless development is perceived by the recipients as a priority in an overall strategy for living within an environment they know and understand better than outside (national or international) planners.

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