

## CHAPTER NINETEEN

# **Pastoralism, Pastoralists and the State: Towards Resolving Resource-use Conflicts for Sustainable Animal Agriculture in Nigeria**

J. O. Gefu, PhD., FNSAP, FAvH, FICA, LMNSAP, AAS, KSM  
*Professor of Rural Sociology and Pastoralist Systems  
and Former Executive Director  
National Animal Production Research Institute, Shika  
Ahmadu Bello University, PMB 1096, Zaria, Nigeria  
j.gefu@yahoo.com*

### **Introduction**

Over half of the world's one billion extreme-poor of which are an estimated 500 million pastoralists are estimated to fully or partially depend on livestock for their livelihoods. Livestock products make a substantial contribution to nourishing people around the world, providing almost one-third of humanity's protein intake. Furthermore, the livestock sector has a substantial economic role, accounting for some 40 per cent of world agricultural GDP. At the same time, the demand for livestock products continues to expand due to growing populations and incomes, along with changing food habit and preferences resulting from improved living condition around the world (ILEIA, 2010).

The potential of livestock to reduce poverty is enormous. Livestock contribute to the livelihoods of more than two-thirds of the world's rural-poor and to a significant minority of the peri-urban poor. The poorest of the poor do not have livestock, but if they can acquire animals, their livestock can help start them along a pathway out of poverty.

Livestock fulfil crucial role both in supporting the livelihoods of livestock farmers around the world as well as the opportunities that exist for them to meet increasing demand. Yet, there are also many indications that an increase in animal production could be unsustainable. Intensification of livestock systems can yield more output. Livestock systems, such as the "factory farms", have been shown to contribute a large percentage of greenhouse gas emissions that increase the effects of climate change. The global trend is to focus on maximizing the production of livestock products using locally available inputs such as those undertaken by smallholder producers – notably pastoralists.

Livestock production naturally complements crop production in a variety of ways. In Nigeria, livestock provide inputs that can increase soil fertility and the productivity of cropping systems (through the use of animal wastes), they are sources of power and transportation (animal traction). Increasingly, animals have served as source of farm power to increase land area brought under crop production at the household and national levels. Draught animals (which are most often sourced from pastoralists' herds) would not only permit an increase in the area brought under crop cultivation but also lead to increased production per capita and hence increased agricultural outputs as well as increased availability of crop residues for ruminant animal feeding. The natural synergy that exists between the two production modes (crop and livestock) could only be better deployed to achieve additional income for crop and livestock producing households as well as increased gross national product.

In some situations, the 'livestock ladder' may allow the poor to progress from modest livestock holdings, such as a few poultry, to acquire sheep and goats or pigs, or even cattle (ILRI, 2003). Livestock production provides a constant flow of income and it provides gainful employment, enhances food security, creates wealth, and could stem rural-urban migration.

Livestock production systems differ from species to species and from one agro-ecological zone to the other. However, they remain largely underdeveloped despite the numerous interventions by various colonial and post-colonial administrations in Nigeria.

Livestock account for about 10 of the 41% contribution of agriculture to Nigeria's gross domestic product (GDP). This represents ca. 2.4% of the nation's total domestic gross product (NBS, 2009). The livestock sub-sector has grate potentials to positively impact rural livelihoods and national wealth if well organized and adequately funded. Unfortunately, this has not been the case since pre-independence era. The situation has been further negatively impacted by rapid population growth (ca. 3% per annum), land degradation, climate challenge leading to degradation of key agricultural and pastoral resources (National Conference on Livestock Reforms and Mitigation of Associated Conflicts, 2023) all of which impact negatively on productivity and rural livelihoods.

Although Nigeria's livestock sub-sector has been dominated by smallholder systems of production, processing and marketing, it nonetheless constitutes an important component of Nigeria's agriculture and source of household food security. Nigeria has a diversity of livestock resources consisting of ruminant and monogastric animals. The ruminant livestock are

concentrated in the drier parts of the country. Cattle are the single most important livestock species in terms of output and capital value. The Zebu cattle are the dominant type found mainly in the Northwest and Northeast of the country. However, due to the effects of climate change in recent years, the 'cattle belt' has steadily moved from the drier sub-arid zone to the sub-humid zone of Nigeria. Consequently, States situated within the zone have recorded increased presence of pastoral producers in recent times with all the attendant resource-use competition and conflicts associated with land use. The cattle population has been observed to be relocating to several parts of the sub-humid zone (Gefu, 1992) to take advantage of reduced disease challenge following the receding of forest vegetation that provided a rich natural habitat to the *tsetse*.

Ruminant livestock are raised by most rural households. Pastoralists (who are predominantly of the FulBe ethnic extraction in Nigeria and some other States in the ECOWAS sub-region) hold ca. 90% of the national and regional cattle population and provide virtually all the local milk and milk products, meat and meat products supplies. Efforts geared towards improving the sector can be a solid base for launching a truly pro-poor programme for poverty alleviation. This is because virtually all rural households keep one form of livestock or another. In a survey conducted by the National Bureau of Statistics in 2011 in twenty-six states, significant proportion of households were reported to keep some form of livestock (NBS, 2012).

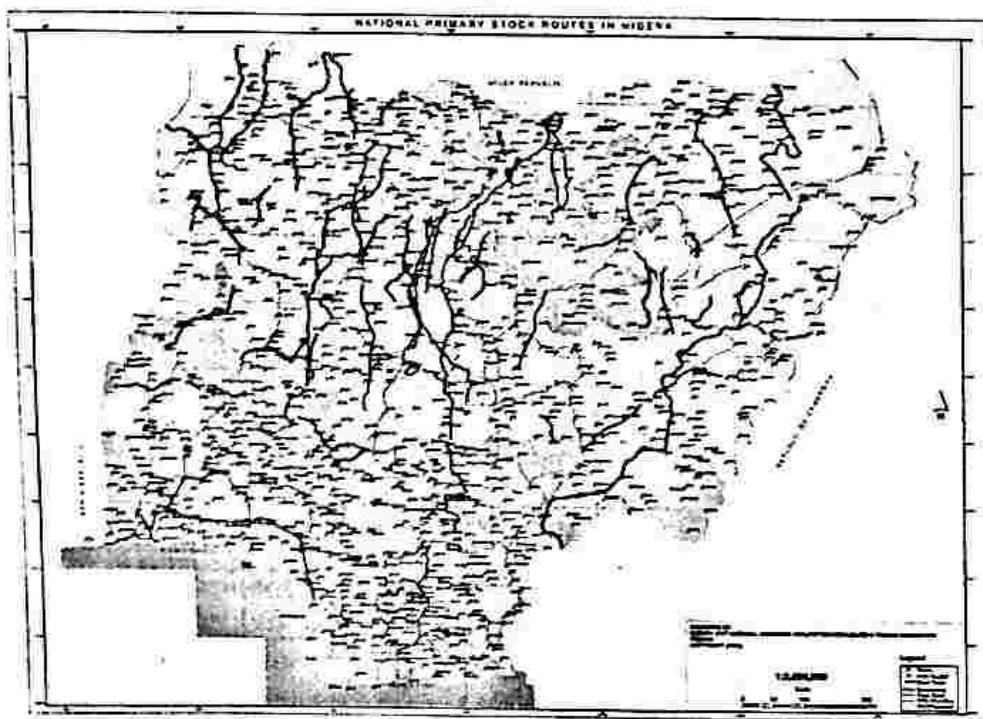
## **Production Systems**

Four broad systems of livestock production can be discerned: Transhumant pastoralism, agro-pastoralism, ranching, smallholder beef and dairy production (Smallholder fattening scheme and peri-urban dairy production). In this presentation we shall concentrate on the first two production systems as these represent the most prevalent production system from where the bulk of domestic meat and dairy products come.

### ***Transhumance and Agro-pastoralism***

This mode of livestock production involves some form of seasonal animal mobility ranging from less than a kilometre to several kilometres within or between eco-regions primarily in search of fodder and water. Movement is dependent on seasonal dictates. The long-distance mobility (sometimes referred to as nomadism) is occasioned by the quest of pastoralists for fodder and water in support of animal production activities. Transhumance may be over a long or short distance. But whatever distance is covered, a notable characteristic of this system of production is that livestock constitute the major

income source. Crop production where practiced, is mainly done at subsistence level. Animal movement is a major feature of pastoral production. Close to 90% of Nigeria's cattle population is kept under this production system. This production strategy has been occasioned by the seasonal alteration in the availability of fodder and water as well as the avoidance of diseases and vectors including trypanosomosis in the high-risk areas where otherwise fodder and water abound. The system involves the grazing of animals over varying distances, depending on availability of water, fodder and security of lives and animals. Transhumance may be between or within agro-ecological zones. Where dry season grazing is available short distance transhumance is practised. Otherwise, pastoralists embark upon long distance transhumance (see Map 1). This may involve traversing several ecological zones and sometimes national boundaries in search of pasture and water.

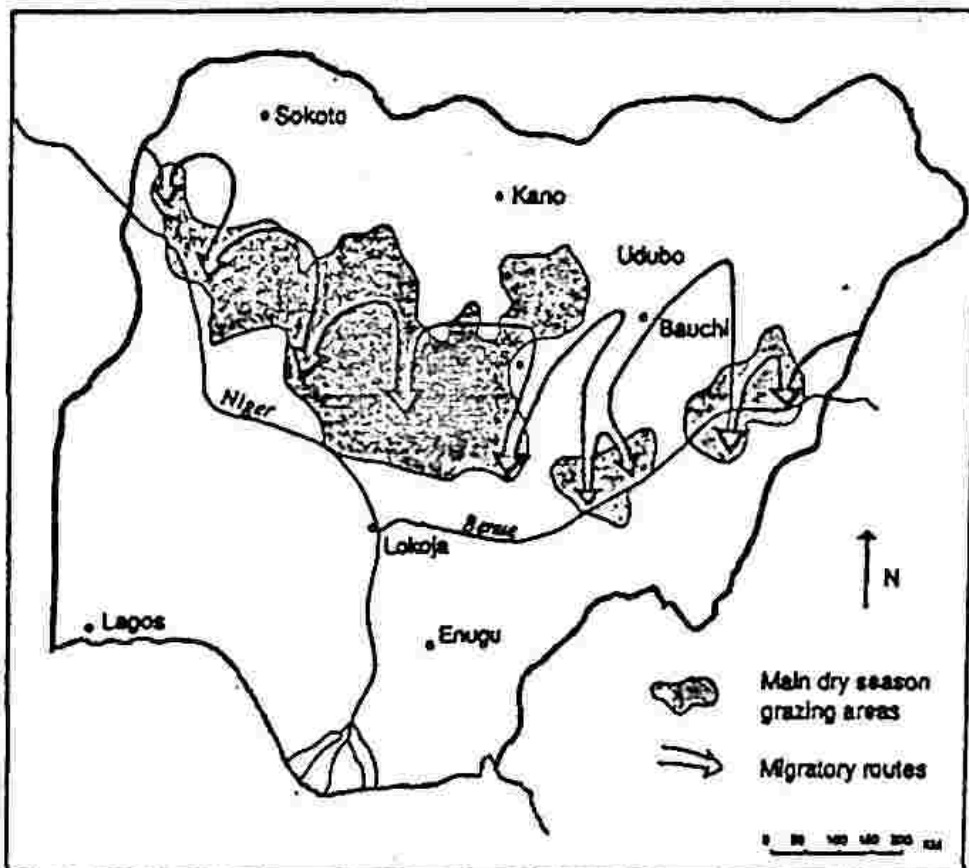


Map 1: National Primary Stock Routes in Nigeria  
 Source: NLPD, 2014

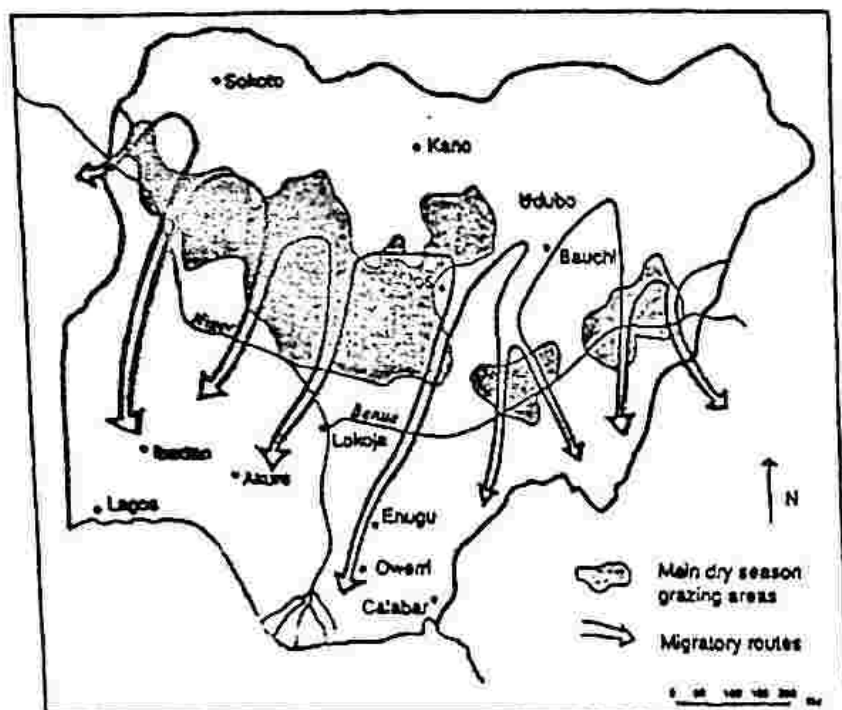
As a result of population and market driven forces, available croplands are being more intensely cultivated to raise food crops. Virgin lands including marginal lands hitherto utilized by pastoralists are increasingly being opened up to cope with the increased cropping needs occasioned by population growth.

Traditional grazing resources often used during the wet season are fast disappearing. The situation has been exacerbated by the climate challenge and global warming which has led to the disappearance of locally adapted fodder and water resources especially in cattle producing belts. Similarly, dry season grazing resources provided by wetlands being increasingly utilized for dry season farming of vegetables and niche crops for urban and peri-urban markets (Gefu, 1996). The rate at which pastoral resources are shrinking has precipitated serious conflict (often resulting in fatality) between crop and livestock producers.

A variety of reasons can be adduced to the incidences of resource-use conflict experienced in different parts of the country. One such reason has been said to be associated with the mobile nature of pastoral production. The extensive production system which has, in recent times precipitated conflicts has been a major concern of successive administration (Gefu, 1992; see Maps 2 and 3). We shall return to this shortly.



Map 2: Extent of southerly pastoral dry season migration (before 1970s)



Map 3: Extent of southerly pastoral dry season migration in the 1980s

In what follows a synoptic examination of past interventions in pastoral communities will be attempted in order to properly locate the genesis of and trends in resource utilization for productive activities.

### Major Pastoral Development Initiatives

Dating from colonial era to present, no specific policy statement has been articulated to address pastoral production beyond statement of intention of governments to settle pastoralists in order to make them visible in development projects and initiatives including provision of fodder/forage/feed and water. Programmes and projects conceived to improve the pastoral sector, including but not limited to vaccination campaigns in colonial times to the RUGA and currently the L-PRES and NLTP initiatives, are in some way conceived to bring succor to the plights of indigenous animal producers. The intention of these initiatives cannot be faulted. However, implementation has been a major problem. In some instances, insinuations are ripe to the underlying motive of some interventions. Arguments for and against some interventions have been advanced. Prominent among such intentions is the RUGA and Water utilization proposals that had been extensively discussed. The idea of settling pastoralists has been muted by successive administrations as a way of

controlling zoonotic diseases as well as imposition and collection of cattle taxes/levies (*jangali*) from pastoral producers.

### *Pre-colonial Initiatives*

Reservation of areas for exclusive use as livestock rearing communities in northern Nigeria is not an innovation in social development in Nigeria. Formal institution in respect of such areas was established in Hausaland with the in-flux of Fulani pastoralists in the 19th Century. Grazing areas, known as the *hurumi* (communal grazing areas) were preserved around townships and large villages throughout what now constitutes the northern part of Nigeria. In the intensely cultivated areas of Daura, Kano and Katsina, those grazing lands were the primary sources of fodder to nomadic herds during the rainy season when livestock had to be kept away from farmlands. The areas and the routes (*burtali*) leading to markets, watering points or other grazing areas were well protected by the Emirate Council. The revenue accruing from cattle levies (*jangali*) was one incentive that particularly reinforced preservation and protection of such areas and safe passages within the domain as no Council would afford losing patronage of pastoral communities to other domains.

### *Colonial Initiatives*

During the colonial era, there were attempts to preserve the *hurumi's* in Kano and Katsina provinces. In many of the reserved areas, deliberate sowing of Gamba (*Andropogon gayanus*) and other improved pasture species was made in order to increase their carrying capacity. A major constraint to that effort, at that time, was lack of legal protection and encroachments by other users. In the face of constraints posed by disease and ecological problems, government policies and programmes have not been totally successful in introducing or encouraging the development of basic technological and institutional changes necessary to exploit the potential that exists for an efficient growth of the livestock sector (Williams, 1989). Pressure on the grazing lands from the towns started building up as a result of population increase of both human and livestock. These developments were observed to have a negative impact on pastoralism since the grazing areas were not protected. In the 1940s and 1950s, in an attempt to improve the productivity of the local breeds, several Livestock Improvement and Breeding Centres (LIBCs) were established in different parts of the country to embark on cross breeding. Most of the programmes embarked upon were not directed at the pastoralist communities as they were oriented toward cattle ranching for raising crosses to boost milk production targeted for the expatriate population predominantly in Vom and Lagos areas.

As early as 1900's the colonial government saw the need to settle the nomads. The argument then was that the future of livestock production in Nigeria hinged on the sedentarization of the nomads. The idea of settled cattle production informed the establishment of the ill-fated **African Ranches Ltd** as an exemplar/model of cattle production enterprise. This private ranch in Nigeria, which operated between 1914 and 1923 when it was given up to the government, was a pioneering attempt by the colonial administration to try the idea of intensive sedentary form of livestock production in Northern Nigeria. The ranching idea was certainly very alien to pastoralists considering the high level of investment involved. Successive administrations and private individuals at different epochs have toyed with the idea of ranching under different nomenclatures and names with little success. Then in 1942 the idea of settling nomads was actually put to work in the Jos area (middle Belt, Nigeria). Selected pastoral households were allocated four hectares of pastureland with the hope that they would not only settle permanently, but also engage in mixed farming (agro-pastoralism). The carrying capacity of the allotted four hectares was grossly inadequate to support the pastoralist stock which generally averaged between 100-150 heads of cattle. The allotted land was soon overgrazed due to over stocking and the patches of allotted land were subsequently taken over by mining companies that sprang up following the discovery of tin in the Jos area - thus aborting the programme. And so, the intention to settle pastoralists suffered a setback at the earliest attempt.

The difficulty faced by the colonial administration in their attempts to settle the nomads had to be reviewed. This formed part of the terms of reference of a mission from International Bank for Reconstruction and Development (IBRD, now World Bank) which visited Nigeria between 1949 and 1954. The mission was to examine the livestock sub-sector economy in the context of bringing about improvements in the pastoral production system. The mission's report considered the free-range management system used by the pastoralists as counterproductive, inefficient or wasteful (i.e. resource-depleting), and thus, undesirable. It was felt that pastoralism should be discontinued and replaced with sedentary mixed-farming systems.

In line with recommendations of the IBRD review mission, a pastoral programme termed "Fulani Amenities' Programme" was established by the colonial administration. The programme offered, among other things, animal health services, promotion of hay and silage production and provision of supplementary feeds for dry season feeding. The supplementation package (with a subsidy to be phased out over a period of six years) consisted of equal parts of groundnut cake and cottonseed cake and mineral salt licks. In



addition, common salt was offered to pastoral families as incentive to encourage and promote settled animal production. The Programme was fraught with problems which became manifest with the unfolding stages of implementation. When the North was so buoyant in groundnut and cotton production, the supplementation package could be provided at affordable prices but as production declined in the wake of political independence the cakes became scarce and too costly to allow sustainability of the package. Similarly, the fodder conservation technology of hay and silage making was soon to be found inappropriate for a mobile livestock production system which has for centuries exploited natural vegetation and consider forage as gift of nature.

The modest achievements recorded in animal health (through extensive vaccination campaigns/programmes and the accompanying eradication of reproductive diseases in most of the producing communities) brought along increases in stock numbers, and intensification of grazing pressure that accelerated degradation of the fragile semi-arid rangelands. Thus, with overgrazing and feed shortage, the programme accentuated transhumance rather promote sedenterization: thereby necessitating further review.

### *Post-colonial Pastoral Development Initiatives*

After the attainment of political independence, the "Fulani Amenities Programme" was reviewed and consolidated into a comprehensive pastoral resource development programme. The reviewed version recommended the establishment of facilities such as marketing channels, watering points, veterinary posts and most significantly the establishment of grazing reserves in major pastoral areas of Northern Nigeria. In recommending the establishment of grazing reserves, the World Bank argued that grazing reserves would make it easier to provide pastoralists with social infrastructure as well as control of bovine diseases. Through this intended policy, it was envisaged that livestock improvement efforts would be enhanced through better animal health services, crossbreeding, pasture production, utilization and management, controlled grazing, etc., and that pastoralists' basic needs would be better served.

The general idea behind the grazing reserve programme was that better management practices would be provided under conditions favorable to livestock production. Facilities such as fodder, feed supplements, regular water supply and veterinary services would be readily available to enhance animal health and productivity. With the provision of all these facilities, it was hoped that pastoralists, especially the nomadic group, could be induced to sedentarize and be introduced to improved management practices of animal husbandry.

In order to implement the programme, the then Regional Government of Northern Nigeria sought the assistance of the United States Government. With technical and financial assistance under the auspices of United States Agency for International Development (USAID), the Regional Government embarked on establishment and development of grazing reserves in major pastoral areas of Northern Nigeria. The assistance package included, among other things, range resource development and management, animal health services, provision of supplementary feeds for dry season feeding and establishment of support facilities such as marketing channels to promote higher offtakes. A significant aspect of the package is the capacity building in professional manpower through which several young students were sent abroad to undergo training in professional disciplines of veterinary medicine, range management and animal husbandry. The idea behind the training component was to have developed, by the end of the tenure of the USAID assistance, a core of sufficiently trained manpower in relevant disciplines that would ensure continuity and sustainability even after the departure of the expatriate technicians.

In 1962, a supplementary feed programme, which was subsidized, was introduced in northern Nigeria. The aim was the feeding of concentrate to cattle so as to reduce dry season weight loss. The scheme was also an attempt to encourage nomadic pastoralists to settle permanently. The supplementary ration took the form of equal parts of groundnut cake and cottonseed cake plus 2% common salt and mineral licks (Federal Ministry of Agriculture, 1981). Although the response of the pastoralists was positive, the scheme did not have the desired impact due to inadequate supply and untimely distribution of the supplements (Williams, 1989). In the early 1960s a smallholder cattle fattening scheme was introduced in the south-west in which participating farmers fattened local cattle for supply to slaughter in the adjoining urban slaughter houses. The scheme proved successful and the experience led to the establishment of a Smallholder Fattening Scheme as a component of the World Bank assisted First Livestock Development Project (Federal Ministry of Agriculture, 1981).

In 1965 the Regional Legislature passed the Grazing Reserve Law to give legal backing to grazing reserves and stock routes. This law empowered the Ministry of Animal and Forest Resources and the Native Authorities to acquire any given native land and constitute it into a grazing reserve. Provisions were made for development of pastures, permanent water supplies and animal health care services. These were incentives to be provided for the gradual sedentarization of the pastoralists.

The programme, as all other affairs of the nation, was to be seriously affected by Nigerian Civil War disturbances of 1966-1970. This notwithstanding, various infrastructural developments had been carried out and scores of trainees had been able to complete their professional trainings. The assistance has also been instrumental in the establishment of faculty of veterinary and animal sciences at Ahmadu Bello University for training of graduates and College of Animal Sciences of Mando, Kaduna for middle level manpower training in areas of range management and animal husbandry. Basic infrastructures that included water sources, veterinary clinic, fire traces, milk collection points were developed at Runka Grazing Reserve in Katsina and Sokoto provinces, Udubo Grazing Reserve in Bauchi province and Wase Grazing Reserve in Plateau province. With infrastructures in place some form of rotational grazing and fees for grazing permits were introduced, for example, in the Runka Grazing Reserve.

It must be emphasized at this juncture that all along the development of pastoral resources had been more or less a regional affair. The Northern Region had placed high priority in the development of the livestock sub-sector with a view to increasing production and sustaining its comparative advantage in production of meat, hides/skins and other animal products for internal consumption and export trade. However, with the demise of Northern Regional Government, the States that were carved out of the Region abdicated their responsibility of developing their livestock resources and tended to over depend on the initiatives of the central government. This had serious implications on focus, priorities and implementation techniques of livestock development interventions, particularly with regards to the basic needs of the pastoral communities.

With the conclusion of the civil war, the Federal Government embarked on ambitious plans to turn around all sectors of the nation's economy, including the livestock sub-sector. Since the 1970s in all the activities proposed within the sub-sector, the establishment of grazing reserves has been consistently emphasized. For example, the Third National Development Plan of 1975-80 proposed consolidating a total of 22 million hectares of land area into grazing reserves. However, to date, only about 2.84 million hectares have been acquired.

The Nigerian Livestock and Meat Authority (NLMA) was established in 1971 by the Federal Government to principally operate abattoirs, cattle farms and wholesale meat marketing. The emphasis of the Nigerian government during this period was direct investment in production; intensive feed lotting involving cattle. The NLMA started the Mokwa Cattle Ranch in 1972 with

bilateral assistance initially provided by the German government (Federal Ministry of Agriculture, 1981). Sugarcane molasses was readily sourced from the Bacita sugar factory as an important component of feed for fattening local bulls over a three-month fattening period to attain an average liveweight weight of 300 kg. Although the scheme was initially successful, poor implementation crippled the programme (National Livestock Production Company, 1980).

### *Access to Land for Grazing*

The Land Use Act of 1978, which put all lands in Nigeria under the control of the State, vested powers of allotment of up to 5,000 hectares of land for the purpose of grazing animals. The powers of land allocation was vested in the hand of the state Governor and Local Government Chairman. By this law, persons or groups desirous of embarking on livestock production could, in principle, access up to 5,000 ha of land. But this was not applicable to the majority of practicing pastoralists. Therefore, access to land for grazing continued to be a major bottleneck for the pastoralist. The National Agricultural Policy of 1988 provided that a minimum of 10% of the national territory (ca. 9.3 million hectares) would be acquired and developed into grazing reserves. This was not actualized rather access to grazing lands was further hindered by the expansion of crop cultivation under various crop expansion programmes (notably *Fadama* programme). This programme opened up lowlands for accelerated food crop production, especially niche crops, thereby denying pastoralists access to watering points particularly during the dry season.

### *Grazing Reserve Development*

Interventions aimed at re-organising the production systems of livestock as well as promoting some degree of commercialism continued into the 1980s and 1990s. The First and Second Livestock Development Projects jointly financed by the Nigerian government and the World Bank were some of the major landmarks in the country's livestock sub-sector.

In 2002, and "in realization of the implications of the continuous neglect of the pastoral sub-system and its imminent consequences on food security and national security, the administration of Buhari has set up an expert committee to advise him on the ways and means to accelerate the production of livestock including the settlement of pastoralists as a first step to addressing the concern for the livestock sub-sector . . ." (Federal Ministry of Agriculture and Rural Development, 2003). Consequently, an 8-man committee was inaugurated to,

among other things, articulate a programme "...to accelerate the development of grazing reserves and stock routes and settlement of pastoralists through the provision of necessary infrastructure, land tenure rights thereby improving the production of livestock nationwide. The expected outcome included availability of fodder, all-year round watering facilities on the grazing reserves and along stock routes, animal health facilities and land tenure rights for pastoral families and clans" (FMARD, 2003). The cost of the programme was put at the equivalent of ca. \$42.1 million (at 2003 exchange rate) to be funded by Federal Government (70%), State Government (30%) and Local Government (20%). The fund was earmarked to develop 162 grazing reserves out of the 433 identified. The main criteria for selecting the grazing reserves to be selected included size of the grazing reserve (>20,000 ha), Status of reserve (i.e. whether gazette or not) and livestock population. By these criteria most of the grazing reserves located in northern Nigeria qualified for intervention. Mobilization of funds was swift to provide dams, roads and boreholes which stimulated an unprecedented influx of pastoralists. This resulted in overcrowding and the over grazing which rapidly set in – the tragedy of the commons! Most pastoralists were left with no option than to move out of the grazing reserves as the grazing reserves were literally turned into a "desert bowl". Therefore, the gains of the project were rapidly watered down by the huge animal numbers that moved into the grazing reserves.

In 2019 the Government of Nigeria received an approval for a loan of US\$200 million from the International Development Association (IDA), over a six-year period, for a livestock productivity and resilience support project. The project components include: manpower development for service delivery; value chains enhancement and crisis prevention and management. Six states were originally earmarked but later reviewed to involve any State that expressed interest and able to meet draw down conditions. The project objective was to improve livestock productivity, resilience and commercialization of selected value chains and so to strengthen the country's capacity to respond to an eligible crisis or emergency. The project aimed at transforming the livestock sub-sector in selected target states. The project has been delayed for over three years and it is just coming upstream in 2023. The direct impact of the project on pastoralists is yet to be seen beyond the stated conflict mitigation component.

From above, it can be observed that attempts by previous administrations to address the plight of pastoralists have, to date, recorded limited success largely because they focused almost exclusively on technical and infrastructural needs of beneficiary communities. These programmes have

often not taken cognizance of the fundamentals of pastoral economy and society. Often times, development interventions are pushed to pastoral communities with little or no understanding of the indigenous knowledge base of the people. To this extent interventions are often not a reflection of the realities which pastoralists are confronted with. Although the programmes have good intentions in ameliorating some of these challenges and uncertainties, little success has been recorded to justify the huge budgets sunk into these projects. The production bottlenecks pastoralists face has continued to limit the potential of the sub-sector to contribute to sustained household and national earnings and pose threats to livelihoods and food security of pastoral households and by extension national food security.

There is the need, therefore, for paradigm shift from the conventional wisdom as espoused by range, veterinary and animal scientists in the art of doing science to that of determining appropriate models of pastoralist behaviour which will enable us to properly address what pastoralists are, what they do and why they do things the way they do. Meaningful and sustainable intervention can only be predicated on the understanding of pastoralist behaviour pattern. It is the pastoralist, who wears the shoes that feels where it hurts, who should dictate the path to go when and if development intervention is contemplated. Therefore, inclusiveness of pastoral communities in planning and execution of programmes is absolutely essential.

Pastoralists can be considered "expert livestock managers" considering their use of coping mechanisms at different epochs of agro-ecological and climatic twists. Pastoralists have adopted strategies such as selective grazing to rest fragile rangelands, they practice herd diversification and select specific animal breeds for certain desirable genetic traits such as fertility, disease resistance, hardiness, drought-tolerance, etc. in response to the demands imposed by factors external to pastoral control.

For pastoralists the use of common property resources constitutes the major access to land (and water). Because common properties are often in the public domain, to which every member of the group has a use right, issues arising from the competing demands for and use of these resource base pose significant problems that border on pastoral livelihoods, household food security and environmental harmony. The dynamic situation needs continual assessment and understanding in order to isolate the critical factors that need be taken into account in policies and programmes meant to enhance livestock productivity.

If the mistakes of past interventions in pastoral areas are to be avoided, there is a need to redefine and sharpen some of the means of improving the

wellbeing of pastoral peoples. Due to their spatial location, the needs of pastoral communities differ and so should be the approach employed to understand and solve problems. This calls for a deep understanding of the production and knowledge system. This will prepare the grounds for a more penetrating analysis of the pastoral problematic. This state can only be achieved through adequate consultation with producing communities who are custodians of the age-long animal keeping tradition and better placed in describing production parameters and limitations and proffer relevant and sustainable mitigative interventions. The entry point for improving production, therefore, is the community where production decisions are made in the face of prevailing and dynamic environmental challenges.

### *State of Livestock Production*

Enabling production environment including conditions that facilitate a sedentary production system has largely remained unavailable to producing communities. Key in this regard is secure access to production resources and infrastructures. It has been proved time and time again that pastoralists are most willing to settle where the conditions are ripe. Recent case studies from various parts of the country support the assertion that pastoralists have spontaneously settled to pursue their livestock production activities (Gefu, 1992; Gefu, *et al.*, 2008; Ajala and Gefu, 2003; Ajala, Gefu and Mohammed, 2004; Ajala, *et al.*, 2006a; Ajala, *et al.*, 2006b). There is also evidence to show that the demand for milk and dairy products, which have risen astronomically due partly to population growth, especially in urban and peri-urban areas and changes in consumption habits, has been largely met by pastoral producers settled in various urban and peri-urban communities. Locally sourced milk and dairy products have continued to struggle to keep pace with exponential demand especially in recent times. Between December 2022 and February 2023 figures for imported milk and dairy products has been estimated to hit 83 billion naira. The paucity of data on production and demand for livestock products has lingered on for a while. Available data presented in the figure, though dated, present the huge gap between production and demand. The 2009 figures can be assumed to have deteriorated considering improved living standards and change in food habits especially in urban and peri-urban areas. The growing gap between production and demand has continued to be met by food imports of protein origin.

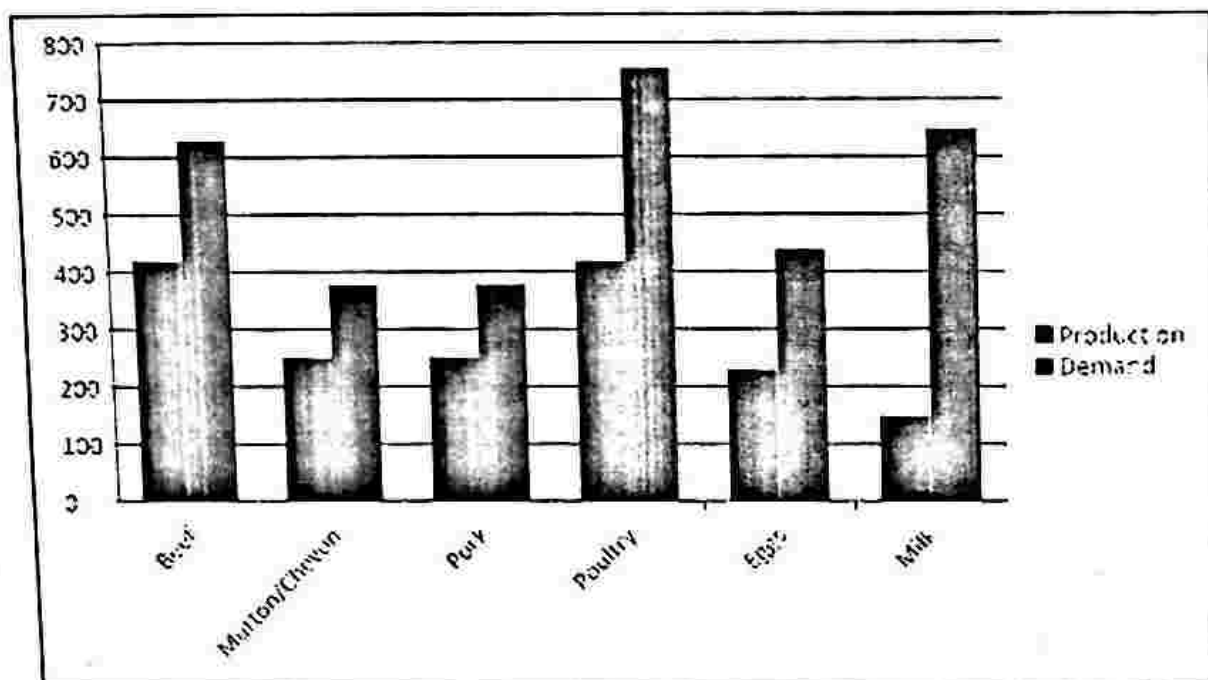


Figure 1: Estimated Production and Demand Levels for Livestock Sector  
 Source: Federal Department of Livestock, 2009.

### *Is Settlement of Pastoralists the Answer?*

In Nigeria, the bulk of ruminant livestock production (cattle, sheep, goats and camels) is in the hands of pastoralists, who rely largely on traditional herding practices. They move with their herds and flocks from one location to another in desperate searches for grazing pastures and water for their animals. As earlier indicated, using a number of settlement models, the federal government attempted to encourage pastoralists to settle in grazing reserves (both gazetted and non-gazetted) scattered all over the country, but with little success. Some of the problems militating against government's efforts at promoting livestock production through settled pastoralism include: socio-cultural beliefs and practices of herders; non-regulation of herd/flock size of stock; poor stock marketing system; weak linkage between herders and other stakeholders; poor physical infrastructure; lack of dairy processing facilities, among others.

Possible solutions are feasible through commercialized pastoralism. This calls for a complete re-orientation towards commercial production with a drive for profit making. Closely related to this is the need for regulation of herd sizes to make them commensurate with carrying capacity of the respective grazing areas/rangelands. Over the two decades or so, the national herd has witnessed about three-fold increase, yet the land available for grazing keeps diminishing



due to increased farming and construction activities by the ever-increasing human population (see Table 1).

Table 1: Land use in Nigeria

Total Area = 92,376,800 Ha					% Change since 1997
Land Use	1997	2002	2007	2012	
Arable land	33,200,000	34,000,000	37,000,000	35,000,000	+5.421 (1.8 million Ha)
Permanent crops	5,300,000	6,300,000	6,400,000	6,700,000	+26.42 (1.4 million Ha)
Forest cover incl. G/R	14,370,000	12,320,000	10,270,000	8,220,000	-57.2 (6.15 million Ha)

Source: Adapted from FAO, 2016.

Commercializing pastoralism also calls for improvement of livestock marketing institutions and the linkage between herders and the private sector. Organizations such as Miyetti-Allah Cattle Breeders Association (MACBAN), the Pastoral Resolve (PARE) and others with similar objectives should be strengthened and operationalized. Previous administrations at the national and sub-national levels have paid little attention to the plight of pastoral communities in manners that would directly impact their overall welfare through initiatives that target pastoral vulnerable groups (women, youth, destitute, etc.). The lack of focused action has contributed greatly to the socio-economic and political marginalization of pastoralists and consequent costs to society (impoverishment, conflict, etc.).

The right attitude must be cultivated toward the pastoralists by all concerned especially those in the position to positively influence policy and programmes. Key players in all tiers of government, particularly at the local government and community levels, should, as a matter of necessity, be aware of the role they play in attitudinal change, which would result in a better understanding of the issues involved in adopting policies conducive to pastoral production. An attitudinal change will go a long way in influencing not only policy but the allocation and reallocation of government and donor budgets to pastoral development. These are critical inputs that have great potentials in bringing about sustainable productivity and improved livelihoods in rural settings, which must be translated into political will and effective action to render the system better prepared to respond to long-term demand growth and more resilience against various risk factors (FAO, 2009) that confront both livestock and crop production.

It must be said that Nigeria has what it takes to be self-sufficient in food of animal origin. All that is needed is to mobilize political will and build the necessary institutions to ensure that key decisions on pastoral investment and policies are effectively implemented. This will set the stage for increased institutional support geared toward enhanced pastoral productivity and improved, sustainable livelihood (PARE, 2009). By focusing on the issue of advocacy and establishing working relationship with key players in pastoral communities, development interventions are set on a path of re-awakening the consciousness of government and civil society to the role pastoralists can play in ameliorating hunger and malnutrition especially in rural Nigeria. This is geared toward raising awareness and created commitment at various levels of government and civil society. Through intimate dialogues with the various stakeholders, a new and additional momentum on pastoral development initiatives would emerge at different levels.

### **Reasons for Pastoralist/Farmer Conflict**

The predominant mode of livestock production is pastoralist system which is practiced largely by persons of the FulBe extraction. They are popularly referred to as the Fulani. This system of production has been severely incriminated in the recent past as being unproductive and destructive of crop fields of neighbouring communities. The current challenges of conflicts between pastoralists, farmers and other socio-economic groups in different parts of the country has been widely adduced to several reasons. Top on the reasons advanced is the destruction of farmlands by cattle owned by the Fulani. This has reached varying levels of proportions leading to the loss of valuables including human lives. Hardly would a day pass without a news item either in the electronic or print media on this phenomenon. Farm crop destructions are often said to be largely unintentional or unavoidable. Pastoralists have often claimed that their traditional grazing areas and watering points have been blocked through encroached cropping. It has been observed in several instances of cattle route or grazing land encroachment that farmers take advantage of the fertile lands left after animals had been kraaled to crop such land. This often leads to blocking of cattle routes and watering points to the extent that pastoralists are severely handicapped in manoeuvring cropped fields. Animals, therefore, trampled and/or grazed on crops.

This situation often arose due to lack of observance of regulations and laws guiding the establishment of grazing lands and cattle routes. This has direct bearing on the implementation of Government policies and programmes relating to Pastoralists development, particularly in areas of grazing reserves

development, provision of infrastructure and services and the settlement of Pastoralists.

Lack of public knowledge of such rules and regulations may be cited for encroachment, but in several established cases (as was found in Gayam grazing reserve) farm crop encroachment was observed to be a deliberate act. These have implications for the strategies and modalities for galvanising stakeholder support towards addressing the problems of conflicts, improving livestock productivity and broad stakeholder support towards the settlement of Pastoralists; and the need to design and implement Settlement Programmes for Pastoralists.

The increased incidence of pastoral resource encroachment (and by extension, escalating conflict between farmers and pastoralists) can be traced also to rapid decrease in land areas available for traditional livestock rearing in all parts of the country and its implications on traditional livestock breeding. Particularly, the increasing encroachments on grazing reserves, *hurmis*, stock routes and other marginal lands utilised for livestock rearing. This is coupled with the inability of government to provide an enabling environment to settle Pastoralists over the years, which is largely responsible for the failure of previous initiatives in settling the Pastoralists. The non settlement of the Pastoralists is largely responsible for the current conflicts with farmers and declining productivity of the livestock sub-sector. This has resulted in the decline in the productivity of the national herd, leading to massive importation of dairy products, beef and live animals draining the scarce financial resources to importation. The perennial violent conflicts between pastoralists and farmers resulting in colossal loss of lives, property and productive resources for both the pastoral and agricultural communities on one hand and resulting to huge expenditures on security are all outcomes that have been painfully condoned. Where pastoralists have found safe heaven to lead a settled livestock livelihood, they are soon constrained to relocate due to the gross inadequacy of essential livestock production infrastructure including livestock watering facilities, veterinary clinics and training facilities, among others. The situation is often further compounded as a result of weak provision of essential services including extension, veterinary, human health and educational services. This has negatively impacted on Pastoralists ability and skills to improve herd health management, pasture production, breeds improvement and effective marketing of dairy.

### *Livestock infrastructure*

Government has made some infrastructure available for the use of ruminant livestock producers in various parts of the country. The most common facility

remains the grazing reserve where other services are provided for the use of pastoralists.

The Grazing Reserves Law of 1965 was an attempt by Government to settle nomadic pastoral families and their herds. Grazing reserves are areas acquired by Government for the purposes of developing it for use by pastoralists. The law stipulated procedures for acquisition, development and management of the reserves. Although the law is almost 3 decades old, there are only few grazing reserves which have been gazetted, developed and fully operational. Indeed, of the 365 grazing reserves earmarked for development, only 50 (13.7%) have been thus far gazetted.

Overgrazing, fuel wood extraction and encroachment by arable farmers have left the pastoralists with no meaningful grazing land. The land is being degraded with heavy vehicles that ply the reserves to load harvested firewood. This has led to erosion and destruction of the ecosystem. Moreover wildlife have moved out or have been hunted to extinction.

### **Transhumant Routes and Cattle Movement**

Trade cattle movement into and out of the major ruminant producing zones is via transhumant routes on the hoof and by shipment by road. Cattle routes (*burtali*) were established in the Northern region after the Jihad (Holy war). The cattle routes led to *hurmi* (grazing grounds) which were allocated to nomadic Fulani herdsmen for grazing especially during the cropping season. However, with increasing population and absence of legal Statutes to prevent farming encroachment, most grazing grounds and their connecting routes disappeared under cultivation. The cattle routes that run from North to South are divided into three sections. They are the Northwest, Central and Northeast routes. The Central routes pass from the far North and are used by the transhumant herdsmen from Niger and Chad Republics and from Kano and Jigawa States. The North-west route brings in herdsmen from Sokoto and Kebbi States while the North-East routes are used by transhumant herds from Yobe and Borno States. At present most of the cattle routes have been encroached by cultivation and movement of cattle on the hoof is constituting a major problem resulting in serious conflict between herdsmen and arable farmers. The problem has led to loss of lives and properties. The National Livestock Projects Division (NLPD), through a loan from the World Bank attempted to re-trace the cattle routes during the Second Livestock Development Project (SLDP) with the aim of re-establishing them for use by transhumant pastoralists, but this effort was not carried to term. The traditional movement of cattle is from the North to the South and back to the

North at the onset of the rains. During the dry season (May to October), cattle move from the North to the South in search of water, forage and/or crop residues.

### **Some Factors Affecting Livestock and Products Production**

Several reasons have been advanced for the low productivity of livestock in Nigeria. These include, among others, genetic and reproductive parameters, environmental factors including inadequate and poor-quality feed, disease challenges, socio-economic, and cultural practices, government policies and programme priority, high population growth rate, which has driven demand for animal protein far beyond supply. A key factor in the livestock production equation is the land question in the context of access to grazing and watering resources by livestock producers, especially pastoralists. All these have been exacerbated by the climate challenge.

### ***The Land Question?***

In the course of discussing problems confronting the Nigerian pastoralist, the usual factors that readily come to the fore are water, fodder, animal health and recently conflict. Very little attention is given the issue of land tenure and access to pastoral resources. The centrality of the issue that surrounds the system of land use especially in pastoral areas can be clearly seen in the wake of the need to provide pastoralists some amount of security of access to grazing resources. This is borne out of the necessity to pursue a more serene and productive pastoral livelihood. If this must happen, the present pastoral peoples and communities will have to have 'a place' they can call their own. This is the only sure way to get the best out of the huge potentials that exist in the pastoral economy. Regrettably, the way and manner in which land is currently administered in Nigeria leaves a lot to be desired by pastoralists. The need for a land reform is not too far-fetched. This is based on the following assumptions:

- Production is the bedrock of a virile and strong economy. Pastoral production has continued to sustain the domestic protein demand needs
- No nation building can be achieved without equal opportunity and access to resources by all citizens
- Where above are lacking, security is compromised (food, social, political).

There is, therefore, the need to evolve a sustainable and workable land use system that will support productive activities and guarantee national security.

Land reform in most developing economies is inextricably linked (but not limited) to and interrelated with agrarian/agricultural and rural development. This is so because the bulk of the population that reside in rural and peri-urban areas and who engage in primary production depend almost exclusively on availability of land in what ever form this may be required. Land, as the primary means of production in the support of a variety of livelihoods especially for the resource-poor, must be readily available especially for the category of producers considered to be resource-poor. The land question is core to any serious attempt to tackle rural poverty and food security and so must be put into proper perspective. Land must be available to persons and groups who are ready to put same into good and productive use. The provision of food (and the means of producing food) is a fundamental human requirement, which should be met through a properly articulated policy on land. In order to come to grips with the realities on the ground, therefore, a thorough and exhaustive analysis and understanding of all the important variables central to achieving meaningful improvement in the lives of millions that derive varying degrees of livelihoods from land and land resources has to be undertaken. It must be mentioned rather emphatically that the major bottlenecks that stand in the way of meaningful access to and control of land must be removed if significant socio-economic progress is to be made. This is more imperative in the realisation of some of the important goals set for itself by the State in Nigeria within the context of poverty alleviation and food security.

### *Land Use and Land Tenure*

In countries that are predominantly agrarian-based like Nigeria, land is the most valuable asset available to the farming population. In an era of agricultural revolution, coupled with conditions of economic development under the situation of increasing population, structural changes take place, old forms of production give way to new ones in order to suit new socio-economic and cultural situations. Land in this context means "all endowments of nature on, over, or under the surface of the earth, and thus stretches from rural land to urban centres, mines, fisheries and sea-beds, even encompassing the whole ecosystem" (Aboyade, 1972).

The various definitions of land tenure (see, for example, Parsons 1970; Dorner, 1964; Timmons 1943; Famoriyo 1979b), whether seen from an institutional or legal perspective or a network of relationships, can be reduced

to regarding land tenure as that which defines the ways in which individuals gain access to, and acquire rights of use over land, either temporarily or permanently. This implies that certain privileges, opportunities and claims are conferred on the individual user of land. Most developing countries of the world are confronted with land problems in different dimensions and of varying magnitude. In Nigeria, for example, land is the most important resource or single input in the system of agricultural production. Land use may, therefore, be considered as human activity within the entire biotic complex in a given ecosystem. The aim of this activity is to promote prudent land use in order to effect an improvement in the life of the people in general and those of the rural population in particular.

State lands, as Famoriyo (1979a) pointed out, exist in Nigeria through gifts, grants and through the implementation of laws of Nigeria. In accordance with the Land Tenure Law of 1962, States in the northern part of Nigeria were vested with rights of ownership in 'native lands' leaving the individual with only rights of occupation and use of land. This situation has, however, been undergoing some reformation in accordance with the Land Use Act of 1978. All these reforms and changes in the administration of land in Nigeria have resulted in unforeseen adverse consequences on individual and groups of land users in different parts of the country. Our concern in this paper is the extent to which the land question has affected the productivity of pastoralists in Nigeria.

The Public Lands Acquisition (Miscellaneous Provisions) Act 1976, No. 33 was promulgated by the Federal Military Government in 1976. The Act spelt out clearly the basis on which lands compulsorily acquired for public purpose would be assessed and compensation paid. It further specified maximum compensation that would be paid for compulsorily acquired land in different zones in the country. Two years later, in 1978, the Land Use Act was promulgated. This is the most recent measure directed towards land tenure and land use in Nigeria. The Act essentially vests all land in each state of the Federation in the Military Government of that State, to be held in trust and administered for the use and common benefit of all Nigerians. The Act was in response to problems relating to private and public acquisition of land in Nigeria. The Act aimed at easing agricultural production by making land available to agricultural investors in order to promote agriculture. Since its introduction, many comments have been made about the act. One gathers from these that the Land Use Act is one of the most controversial decrees "since it affects the basis of family ownership of land in a rather radical manner and purports to shift the emphasis from land ownership to dynamic land use" (Famoriyo, 1979a).

The intentions of the decree are noble especially in attempting to destroy the cankerworm that had eaten deep into the fabric of Nigerian agrarian system. Land, according to the Act, can be made available to land users to the limit of 1.25 acres (or half a hectare) of undeveloped land in the urban areas and 500 hectares of agricultural land or 5000 hectares of grazing land to be held under customary tenure in the rural areas. Unfortunately, the Land Use Act does not appear to have any positive effect on improving the agrarian situation at present. This is because of the difficulty of implementing the terms of the Act in a situation where ignorance prevails. In the rural areas, however, the terms of the Act may be difficult to implement because in spite of the Act, many Nigerian farmers still find it easier to acquire access to land through the customary land tenure arrangements rather than the Land Allocation Advisory Committee. This is a result of the strong traditional attachment which farmers still hold to land. The case of pastoralists is even more precarious as they have been left out of the scheme of things and at the mercy of community leaders who decide what quantity of grazing is permitted the pastoralist on very short term basis if at all. From the comments made in the past two decades by different professional bodies and a cross section of stakeholders, the objectives and philosophy of the Land Use Act seem to still enjoy the overwhelming support of Nigerians. However, the complaint has been some unnecessary, unsuitable and impracticable provisions and the implementation of the major provisions of the Act (Orojo, 1991). Other concerns raised on the Act include absence of a consideration of our customary practices and consideration of insecurity of title and the vesting of land in the Governors and the requirement of consent. These are areas that need attention if the discomfort brought by the Act is to be avoided.

The land issue has not been made any easier by the inability of relevant authorities to implement the provisions of the Land Use Act. The need to address areas of the Act in order to remove areas that constitute impediment to livestock producers is long overdue. When and if pastoralists are able to freely own their land, it would be much easier to mobilize and commit human and financial resources to developing permanent infrastructure in support of their livestock production livelihoods.

### **Demography**

The problem of locally produced animals and animal products grew at the attainment of political independence and worsened as the years went by. These problems can be situated within the general framework of population and policy dynamics in the country. On the one hand human populations have



continued to expand giving rise to higher food (of animal origin) demands without corresponding expansion in the supply chain which had been hampered by dwindling grazing resources occasioned by limited or lack of accesses of pastoralists to production inputs. Often times, the policies enunciated are in direct contradiction of an enhanced pastoral production, thereby negating the goals of improved agricultural and food production. The short supply of meat and animal products had to be supported by importation. The situation by 1976 was that the volume of food and live animals imported into the country outshot that of export in the same commodity. As local supplies dwindled, increasing huge foreign exchange continued to be allocated for the procurement of meat and livestock products. Colossal import bills were incurred by both the Federal and State governments by early 1980's.

### **Low Input Production**

Another reason that may be adduced to the use of low inputs may be the subsistent nature of livestock production. Except for a few commercial poultry and ruminant farmers, the majority of producers, especially the pastoral producers, are not motivated by overall market forces. To this extent, therefore, they are not motivated to invest on inputs that would accelerate the process of production. Their activities are largely dictated by reasons other than the commercialization motive that is often associated with economic activities. For such livestock producers, subsistence requirements for household members are the overriding determinant of the production endeavor. To this extent, therefore, minimal inputs are expended just to meet the basic needs, and so animals do not express their potentials in a reasonable time frame. This would in turn affect the price producers get for their animals when they are eventually offered for sale. If the price offered for their livestock and animal products are considered unattractive, they may withhold sale. This may even be compounded by the structure and operation of livestock market where middlemen appropriate for themselves unimaginable super normal profit margins, leaving livestock owners only marginally rewarded for all their labour and input. Also the perishable nature of livestock products such as milk, eggs, etc compel the disposal of these products within a specified time period, so as to avoid total loss. All these, among others, have contributed to the low and declining level of protein intake in the country. The result of a combination of these factors has led to short supply of meat and milk in the country. The country has had to resort to importation of these commodities, thereby making Nigeria a net importer of animal products.

### *Policy and Research Issues*

The issue of improved and increased productivity has been a recurrent concern in animal agricultural research dating back to colonial era. The need for improvement of the sub-sector through articulated programme of research, development and information dissemination to end-users has always been made by both communities of scientists and technocrats within and outside Nigeria. Going by the contribution of the agricultural sector before the advent of the oil boom years and the current place of agriculture in terms of productivity and sectoral allocation, a lot of re-thinking and revamping of the sector is imperative. This is so because the future of the country can be said to hinge on the quality and quantity of agricultural production. This is even more apparent for the non-crop agricultural sector, particularly the livestock sub-sector. Indeed, Nigeria can be self-sufficient as well as export livestock products to other countries within and outside the region. All that is required is commitment to relevant problem-solving research agenda which would not only receive generous funding from all concerned but also would transcend political and ethnic manipulations (Gefu, 2004). A sustained agenda for improved production of quality protein would not only lead to enhanced outputs but would raise the quality of living and by implications the productivity of Nigerians, especially the teeming population of the youth. In any economy, research is the engine of growth. This is even more so for the livestock sub-sector, where constant changes are experienced in agronomic practices resulting from climatic and ecological changes, consumption patterns, economic and political atmosphere and a variety of other considerations including fiscal and monetary policy of the central government. But the most important factor in the livestock production equation can be said to be the type of livestock research policy pursued. To a very large extent, the policy on livestock and livestock research would determine the direction in which the sub-sector can be meaningfully improved. Research into livestock matters are germane to the evolution of well informed policy for guided change in livestock production. Conversely, the type of livestock policy in place would, to a very large extent dictate the kind of research problems that would be embarked upon by the various bodies charged with the responsibility of moving the livestock industry forward. For instance, the research institutes with the mandate to engage in livestock improvement will have to operate with stipulated policy framework if they are to receive funding and other logistic support from their parent body. The policy of donor agencies and bi-lateral organizations would likewise determine the amount of off-shore funding that would be available to Nigerian livestock researchers and development workers.

Yet the policies adopted by governments and donor agencies are shrouded in the political agenda of funding agencies.

### *Destruction of Grazing Reserve and Stock Routes*

Lack of or limited access to grazing land due to encroachment of crop farming activities and over grazing has reduced feed available and this, coupled with the obliteration of the cattle routes, have resulted in nasty conflict between pastoralists and farmers. Such conflicts have resulted in the loss of lives and properties.

### **Scarcity of Water**

Due to the long dry season in most parts of the zone, livestock on dry feed necessarily require a lot of water to utilize the feed. Although the zone is well watered by river systems, many areas are dry, hilly and rocky. Although there are many watering points scattered all throughout the zone, the water does not last long into the long dry season. During the wet season, access to watering points is limited due to encroachment of farm plots and the obliteration of stock routes by crop farmers.

### **Weak Veterinary and Extension Services**

Many of the known cattle, sheep and goat diseases are endemic in the zone and inadequate veterinary services and scarcity of drugs have made the diseases to take their toll. Lack of funding of the institutions and agencies charged with the responsibility of extension service delivery has led to inability of staff to conduct regular and effective extension services.

### *Bush Fire*

Bush fires in the dry season has resulted in wiping away the bulk feed so much needed by cattle, sheep, and goats. The short-term effect is depletion of grazing material. The long-term effect is disappearance of valuable species of fodder, which are not resistant to fire. This eventually leads to sparsely covered soil resulting in soil erosion and degradation of the land. In many areas stocks have to move far South of the zone to graze.

### **Co-operative Groups**

Co-operative group formation is important as a preserve weapon and as a means of harnessing resources. Co-operatives can lobby government to legislate policies that favour the sector. Input and marketing of product can be

realised if co-operatives are set up to deliberate on these matters. Lack of funds is a constraint to livestock production. Co-operative groups are likely to be credit worthy to obtain loans from the bank for their production activities and also attract government attention to fund certain aspects of livestock production.

### **Livestock Diseases**

Disease of livestock constituted important factors that affect livestock production. The zone is a large area with varied conditions conducive for various disease organisms to thrive. The disease conditions which are found in the animals include: helminthiosis, contagious bovine pleuropneumonia (CBPP) foot and mouth disease (FMD), dermatophilosis, Pestes des petit ruminants (PPR), black quarter, brucellosis, pink eye and cowdriosis (Heart water). Trypanosomosis in cattle can still be found in the Southerly parts of the zone. No outbreak of rinderpest has been reported in the zone since more than two decades and intact it is thought that Nigeria is free of the disease. CBPP is still a major disease problem in the zone but no outbreaks have been reported in any part of the zone of recent. Foot and mouth disease occurs in isolated cases in the zone but has also been contained. Dermatophilosis is a serious skin disease of Cattle, which is endemic in the zone. Small ruminants suffer from PPR, which cause heavy mortality in some years. The presence of ecto- and endo-parasites and pests result in such diseases as Helminthiasis (especially fascioliasis-liver fluke), Babesiosis, Dermatophilosis, Trypanosomiasis and mange, which are detrimental to livestock production. Udder abnormality in Sokoto Red Goats is a serious condition that is yet to be overcome. Lamb and kids mortality are frequent and high, resulting in low animal offtake.

Analysis of recent field data from Gayam Grazing Reserve (a typical grazing reserve situated in Kaduna State- the heart of Nigeria) revealed a number of challenges faced by crop and livestock producers resident on the grazing reserve.

### **Gayam Grazing Reserve (A Typical Example)**

The Gayam grazing reserve was established in 1979. It was gazette in 1997 under the Ksduna State Grazing Reserve Law (CAP 62 1991). The GR, which covers ca. 13,221 hectares of land in Birnin Gwari Local Government, is comprised of four sectors demarcated in a north/south direction. These sectors (village areas) are: Kachechere, Sullubawa, Chiromawa and Hassan Nayado. The GR lies between latitudes 10° 40' and 10° 50' North and longitudes 6° 35' and 6° 50' East along Kaduna-Birnin Gwari highway. It is also bounded by

Gayam Village and Galan Hills on the southern part and Birnin Gwari-Funtua highway to the north. The GR was recently re-demarcated to cordon off a stretch of *fadama* land to the north.

### Facilities on GR

A perennial river (River Marmara) drains between Doka and Gidan Wakili. This river provides water for household and farming/herding activities, but it also limits access (especially during the rainy season) of children of pastoralists to the primary school located in Doka. A bridge over this river will greatly reduce the long distance school children have to travel to get to school. Several streams are found in the reserve. The reserve is served by only one access earth road which is washed off during the rainy season. The bulk of the settlements are connected by foot paths.

Of the five earth dams, only two are functional which are located at Sullubawa and Gidan Salisu. There are two boreholes located at Gidan Wakili and Dan Magaji. The oldest primary school was established in 2000 at Gidan Wakili. Some of the graduates of this school (presently in the Senior Secondary at Birnin Gwari) were present during one of the Focus Group Discussions. Two nomadic primary schools have been added and are located at Ruga Maidawa and Chiromawa. A veterinary clinic as well as a primary health care centre (both unequipped) was sighted on the reserve (Gidan Wakili). A pasture demonstration plot was reported to have been established several years ago. But because the *styro* plot was not protected (fenced) it was encroached into and grazed down. The demonstration was said to have been poorly organized and so the essence of introducing the concept of sown pasture it did not catch on and so efforts at introducing improved feeding *vide* pasture establishment did not serve the intended purposes.

Cereal and legume crop residues (produced and/or bought) are extensively used as supplementary feed; but these are quickly exhausted because the bulk of crops are harvested during the rains during which time crop residue preservation constitutes a great challenge. Conserved crop residues deteriorate fast due to improper storage and offer to animals. Pastoralists indicated willingness to avail themselves of sown pasture which they are willing to buy. When asked if they would like to establish their own pasture fields individually, they indicated they would rather procure from a source located near their homestead. The expressed preference to buy rather than to establish own pasture fields could be associated with the observations (concerns) made by pastoralists about unsecured access to land. Most pastoralists expressed lack of interest in investing in pasture development

because of apprehension held about tenure security. Furthermore, the rate of alleged encroachment by persons alleged to be government officials was said to have cast serious doubt on the minds of pastoralists who may wish to establish pasture.

Pastoralists reported high use of supplementary feeds especially cotton seed, groundnut cake and wheat offal. These supplementary feedstuffs were said to have been mainly sourced from Birnin Gwari and sometimes in Funtua.

### **The Gayam Evidence**

Following a prior arrangement to meet pastoral households (male and female) and the youth, a Focus Group Discussion was held at Gidan Wakili at the primary school premises. The discussion started with about 29 persons representing various age categories of males and females. The discussion was informal and everyone participated freely. Wide-ranging issues on development challenges facing pastoralist in the grazing reserve were raised. Following the FGD a structured questionnaire was administered to 50 pastoral household heads.

The GR is divided into five sectors (Village Areas). These include Kachechere, Sullubawa, Chiromawa and Hassan Nayaro. The fifth village area is Gayam settlement. Gayam is the only enclave in the GR. Administration of questionnaire concentrated on the four pastoral communities where eleven respondents were sampled from each of the pastoral communities, while six respondents were chosen from Gayam village.

Analysis of data showed that the GR was predominantly (80%) occupied by pastoralists of the Fulbe (Fulani) extraction. Table 2 indicates that 92% of the respondents were permanently settled on the GR with access to varying amounts of land holding. About 64% of the respondents have access to between 1-5 ha of farm land. Several land holdings in excess of 5ha were sighted. It was understood that these largely represented encroachments. Our informant asserted that these encroachers are predominantly government officials who purportedly present letters of introduction for the purpose of farm land allocation on the GR. Many other pastoralists who have low herd size or those that have lost their cattle are said to have more farm land than pastoralists with larger herds.

Table 2: General information on pastoralists in Gayam grazing reserve (n=50)

Variable	Frequency	%
<b>Family size</b>		
1 – 5	24	48
6 – 10	16	32
11 – 15	4	8
>15	6	12
<b>Land holding/ family(Ha)</b>		
1 – 5	32	64
6 – 10	12	24
11 – 15	4	8
>15	2	4
<b>Settlement patterns</b>		
Permanent	46	92
Short-term	3	6
New Commers	1	2
<b>No of <i>Ardos</i> (Clan heads)</b>		
1 – 3	4	8
4 – 7	44	88
8 – 10	2	4
<b>Pastoralist groups</b>		
Fulbe	40	80
Hausa	9	18
Other	1	2

Source: Gefu, *et al.*, 2009

Land allocation was made to deserving pastoralists with genuine claim to livestock production. There is a local land allocation committee comprised of community elders and headed by the Wakili who is the appointee of the Emir of Birnin Gwari. As a general rule, the land allocation committee approves between 5-6 ha to each family. This, however, varies with the size of the household. Families with considerably larger numbers could get a little bit more farm land. Virtually all the respondents practice agro-pastoralism, but deriving higher income from livestock-related production. It must be remarked that this allocation of farm land does not constitute a legal claim to the land so allocated. The understanding of allottee is that of temporal use right. Pastoralists who desire to establish pasture fields may be encouraged to do so if they are assured of tenure security. In this direction, the GR should be demarcated for the purpose of farm land allocation to genuine and deserving pastoralists with some form of security. This will not only encourage pastoralists to invest on the development of such land, but it would put to rest the incessant illegal occupation and encroachment of the GR.

Most pastoral families (80%) ranged between 3 and 10 persons but more families (48%) ranged between 1 and 5 members. Our Key Informant indicated that there were a total of 7 *Ardos* on the GR. This was corroborated by the respondents. Majority (88%) of pastoralists interviewed put the number of pastoral leaders (*Ardos*) at between 4-7.

Our Key Informant estimated 400 households residing in the GR with an estimated population of children standing at 4,400, going by the EPI Campaign of 2008. Cattle holding per household was put at 20. Cattle population in the GR can, therefore, be put at ca. 8,000. The GR is intensely used during the rainy months between July and October. During this period, livestock owners and pastoralists from neighboring communities utilize the GR thereby subjecting grazing resources to more pressure than normal. By far the predominant animal breeds are White Fulani (Bunaji) cattle, Yankasa sheep and the Red Sokoto goat. Women keep a handful of local chickens. The major constraint reported by respondents was encroachment of the grazing reserve by crop farmers from neighboring communities. These encroachments were reported to have led to the blocking of cattle routes which in turn had often precipitated conflict between the two groups.

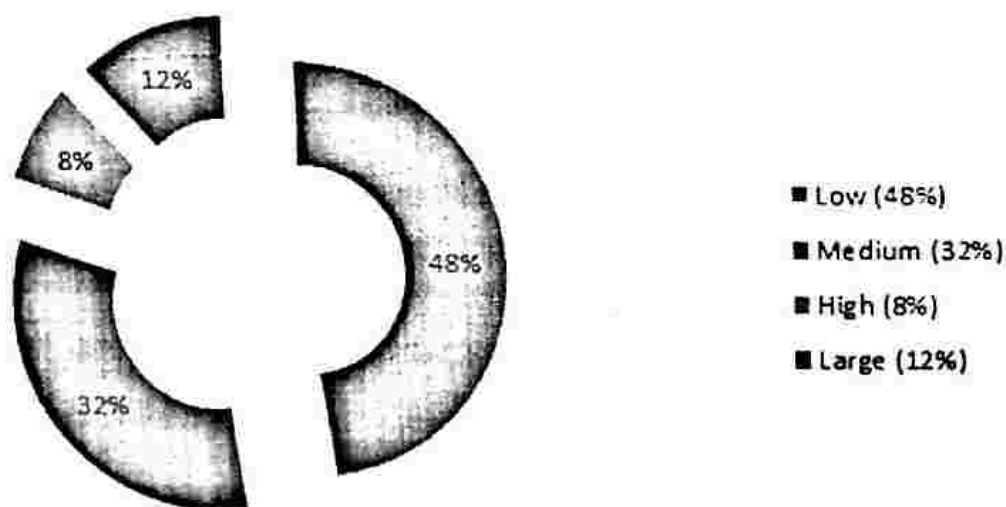


Chart 1: Pastoral family size in Gayam  
Source: Gefu *et al.*, 2009



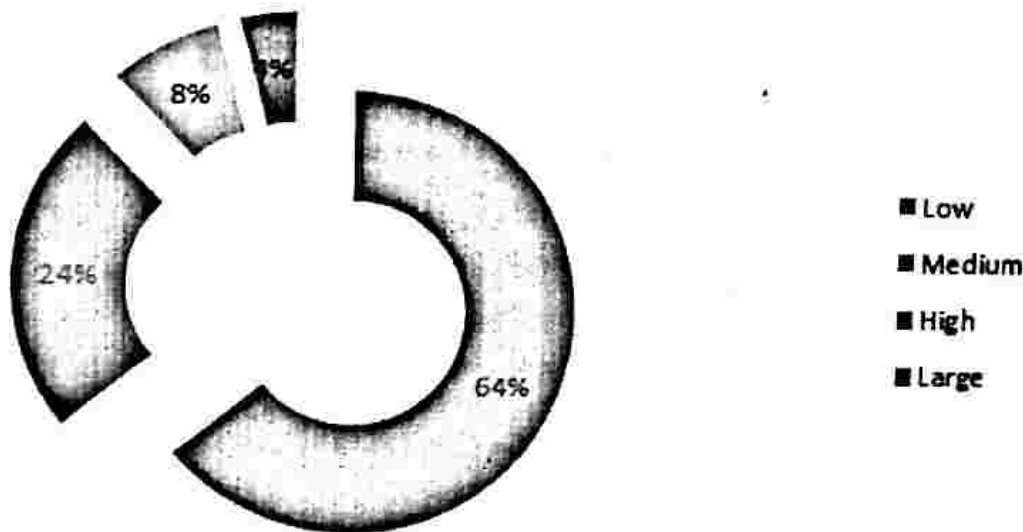


Chart 2: Pastoral land holding size (ha)/household in Gayam  
 Source: Gefu, et al., 2009

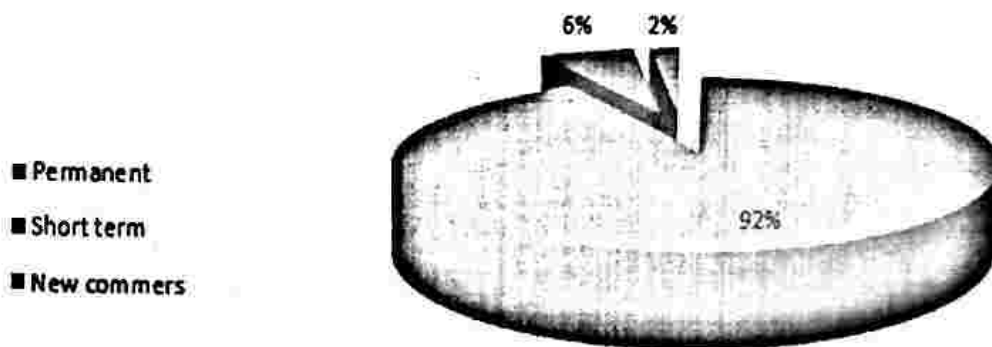


Chart 3: Pastoral settlement pattern in Gayam  
 Source: Gefu et al., 2009

### Farming Systems in Gayam Grazing Reserve

Majority (86%) of the respondents farm both crops and livestock (agro-pastoralism). About 9% and 5% of the respondents claimed they were solely crop and solely livestock farmers respectively. Regarding animal ownership pattern, most (74%) of the respondents claimed the animals were herded under one and the same control of the family. Being the unit of labour organization (and consumption), the responsibility for major decisions is that of the family

with the head of household in control. This observation is closely associated with that which indicated that pastoralists were unwilling to reduce stock numbers (see Table 3), as household members who come of age look on to the household head to provide the foundation herd from the family herd(s).

Pastoralists of Gayam GR seem to have maintained very strong family ties. With a herd size of ca. 20 animals comprising of some 10-12 lactating animals, the household is able to sustain its members from the proceeds of the sale of milk and milk products. Only about 8% of Gayam-resident pastoralists practice some form of transhumance. These pastoralists engage in herd-splitting during the dry months. A group of long transhumant pastoralists were reported to emigrate into the GR during the onset of the rainy season. These have been identified to be Fulani herdsman from Katsina. Grazing activities reach their peak between July and October when those who had split their herds and "foreign" pastoralists return to Gayam GR for the wet season grazing. Some pastoral families do not practice transhumance in the dry season either because their herds have been depleted due to diseases or theft (cattle rustling) or they have just enough animals to sustain the family. The number of pastoral families in this category is said to be on the increase. Such pastoralists are paying more attention to crop cultivation and they generally have larger farm holdings than pastoralists with larger herds. This is shown in Table 3 where pastoralists reported to be engaged more (59%) in crop-based agricultural production.

Table 3: Farming systems and activities in the grazing reserve

Variable	Frequency	%
<b>Farming practices</b>		
Crop farming only	4	9
Agro-pastoralism	43	86
Livestock only	3	5
<b>Animal ownership pattern</b>		
Family	37	74
Communal	3	5
Individual	10	21
<b>Major Products</b>		
Animals/livestock Products	20	41
Crops	30	59

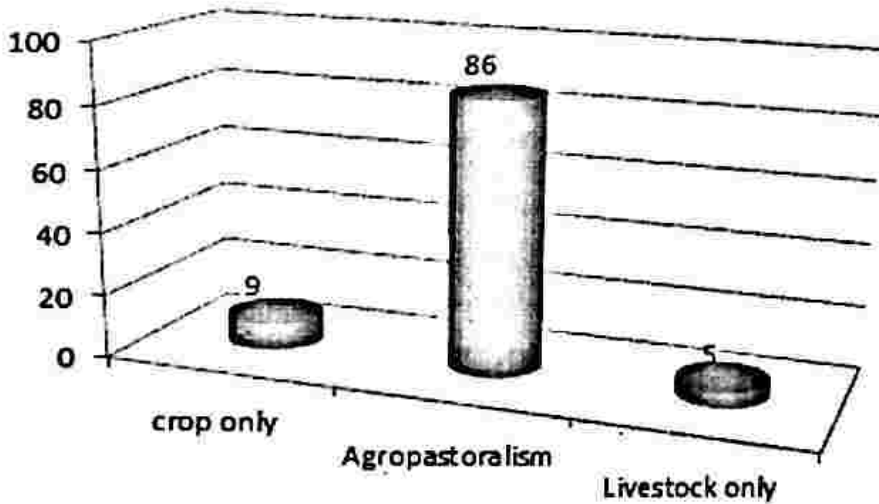


Chart 4: Farming systems practised by pastoralist in Gayam (%)  
 Source: Gefu et al., 2009

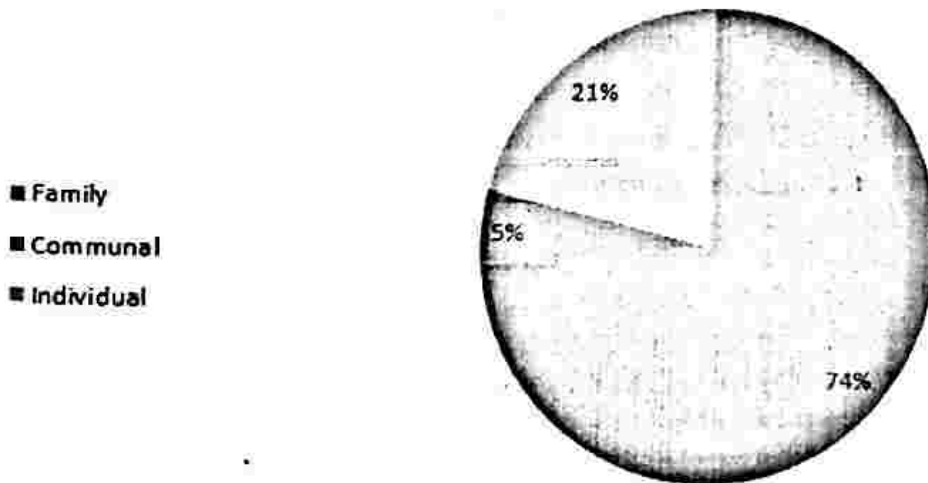


Chart 5: Animal ownership in Gayam  
 Source: Gefu et al., 2009

### Infrastructural Amenities

As a pastoral facility, the GR lacks several basic amenities to which the pastoral communities are entitled as citizens of Nigeria. Such amenities are fundamental to enhancing pastoral productivity and improved livelihood. Just as much as crop farmers have access to basic needs as well as production inputs, pastoralists should be reached with subsidies in terms of livestock

production inputs. One of the avenues through which agricultural productivity can be improved is the availability of improved production techniques. In this regard, extension outreach is a major vehicle for conveying new/improved techniques to livestock producers. This facility was almost non-existent in the GR as reported by the respondents. Only about 70% of sampled respondents claimed they have had no form of contact with an extension agent in the past five years.

The top three areas of need which pastoralists expressed desire for included water, schools and health care centres. Table 3 indicates that 47% of the respondents identified water as the most important facility needed. This is followed by schools (30%) and health care (23%). These facilities were observed to be grossly inadequate. The GR, with an estimated human population (pastoralists) of 6,000 and estimated cattle population of 8,000, is with only two earth dams located at Sullubawa and Gidan Salisu and only two boreholes located at Gidan Wakili and Dan Magaji and three nomadic primary schools at Gidan Wakili, Ruga Maidawa and Chiromawa. A veterinary clinic built by the Pastoral Resolve (PARE) was yet to be put to use as well as a primary health care (both unequipped).

The pastoralists were enthusiastic about and willing to contribute to maintenance of public infrastructure. This is borne out of the overwhelming number (97%) that answered in the affirmative (Table 4). However most (92%) of the respondents indicated unwillingness to reduce stock numbers. This is a clear indication that pastoralists still attach a lot of value to herd size. This is a serious challenge for extension workers who will have a hard time persuading pastoralists to destock to a level that they would be able to get the best out of an improved herd. It may be difficult to convince pastoralists to retain only good and productive animals. Most of the pastoralists seem to be permanently settled as they expressed the desire to keep their permanent abode on the grazing reserve (Table 3). However, a major challenge to development of the GR is the sense of insecurity expressed by pastoralists in terms of leasehold and unhindered access to grazing and farm land.

Table 4: Available infrastructure and pastoralists' attitude

Variable	Frequency	%
<b>Livestock Extension Service</b>		
Yes	15	30
No	35	70
<b>Needed infrastructure</b>		
School	15	30
Health centre	11	23
Water	24	47
<b>Will pay for maintaining facility</b>		
Yes	48	97
No	2	3
<b>Will accept to keep to stocking limit</b>		
Yes	4	8
No	46	92
<b>Willing to remain on reserve</b>		
Yes	50	100
No	0	-

Source: Gefu *et al.*, 2009

■ Schools  
 ■ Human health care  
 ■ Water

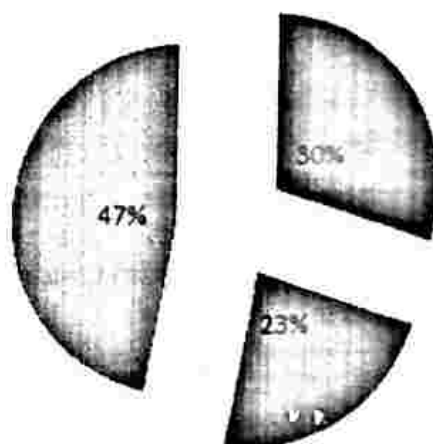


Chart 6: Felt needs of Pastoralists

Source: Gefu *et al.*, 2009

## Major Challenges Confronting Usage of Gayam Grazing Reserve

From the Focus Group Discussion held with both the pastoralists and farmers at Gidan Wakili and Doka respectively, one challenge that was clearly expressed by both the farming and pastoral communities was access to farmland on the GR. The pastoralists on the one hand have considered the GR as their sole preserve and held the view that crop farmers have no business being on the GR. Pastoralists considered anyone other than pastoralist on the reserve should have no place in the GR. Such crop farmers have been considered intruders and should be ejected. Pastoralists are calling for a strict enforcement of the GR Law and therefore, prohibit incursion of all unauthorized person who may come under various guises. The alleged encroachment has been reported to have precipitated considerable disharmony amongst pastoralists and farmers. These land related conflicts on the GR may not go away in a hurry until and unless an official position is taken to resolve the issue of the illegal occupation of some crop farmers found in and around the reserve.

On the other hand, the crop farming communities, especially those found in Gayam village and Doka maintain a strong position that they were in the GR before the acquisition of the place for grazing. They claimed that at the time the reserve was gazette, no effort was made to either relocate the original settlers or pay some reasonable compensations. The crop farmers are claiming it is their ancestral land to which they have been attached for several years. With both sides laying claims and counter-claims, the situation may erupt into serious crisis if immediate action is not initiated by the relevant authorities. The relative calm that exists now has been made possible through the efforts of the late Emir of Birnin Gwari who was said to have brokered peace between pastoralists and farmers by asking farmers on the GR NOT to lay claims to the land. He was said to have appealed to them to remain calm and await an amicable resolution of the issue, assuring that either they would be relocated to an appropriate alternative location and paid adequate compensation. These farming communities are still standing on the promise of the late Emir. In the light of the foregoing, therefore, the State Government (who has the sole responsibility to manage the GR) should properly demarcate the reserve boundaries and ensure strict compliance of the GR law and all ordinances thereof. The GR should be demarcated and allocated to pastoralists, preferably on family basis. However, settlers who have been resident in the GR before the coming of the grazing Reserve acquisition and legislation should be "enclaved" within the reserve and provided enough land for their production activities. The two flash points are Gayam and Danganji. This should be done

with full consultation with the leadership of both pastoral and farming communities.

Another challenge that was expressed is water. Only three boreholes serve pastoralists and neighbouring communities. This is grossly inadequate. Moreover, the farming communities expressed dissatisfaction in the location of water sources, which they claimed are closer or exclusive to pastoral communities. Suggestions include drilling more boreholes at strategic locations for ease of access to both pastoral and farming communities. With these two challenges addressed, and the enforcement of the grazing reserve law to prevent further encroachment, the GR would be ready for further development and the provision of other social and infrastructural facilities including human and animal health services. Some of the animal health problems include liver flukes, Black quarter, CBPP and PPR. Vaccination campaigns are very irregular. The last one was in 2003. It was learnt that pastoralists often organized themselves to avail access commercial veterinary services. FMD was reported to constitute a major health problem to which the pastoralist claimed they have coped by using unorthodox treatment. Following announcement of an outbreak of FMD, people were compelled to confine their infected animals to specified grazing and watering points. This has been largely effective as most people were said to have conformed. Defaulters were sanctioned by social isolation.

Pastoralists travel to Birnin Gwari, a distance of about 15 km to market their produce. The women have to trek this distance to sell their dairy products especially in the rainy season when production improves.

### **Conflicts in Gayam Grazing Reserve**

Two major types of conflict were highlighted. Those involving pastoralists and crop farmers (inter-group conflict) and the other which involved two distinct pastoral groups (intra-group conflict). The first type is usually more serious than the latter. Both conflict types are induced by competition in common resource use.

#### ***Inter-group Conflict***

The incidence of inter-group conflict between crop farmers and the pastoralists emanates from the alleged encroachment of farmers into the grazing reserve as earlier described. This has been exacerbated by the claim by pastoralists that the GR boundary has continued to shrink as a result of farming encroachment by persons alleged to be economically and/or politically connected. A recent incidence was cited of a *fadama* section of the GR that was excised from the

GR. This portion of the GR was said to be a grazing resource in the dry season. With the development of the *fadama* area into cropping land, grazing animals could easily stray into cropped fields, causing crop damage and demand for compensation to be paid by pastoralists. A map of the Gayam GR was recently (2008) produced delineating the boundaries of the GR. The *fadama* in question was marked out of the reserve. Pastoralists claimed that cattle routes are blocked, preventing a safe passage of animals to watering points and dry season grazing. The pastoralists claimed they do not have secured access to land on the GR. This has often resulted in the relocation of pastoral families to different parts of the GR. It was claimed that pastoralists could be relocated from one part of the GR to another. This often arose when a powerful/influential individual desired to acquire patches of land on which animals had been kraaled and made fertile by the animal droppings. Since the pastoralist does not have secured access, he is compelled to move to an alternative land. Some pastoralists were said to have moved out of the GR for this reason. An emerging inter-group conflict is fast developing. This involves children of pastoralists who steal small animals from their neighbouring farming communities. Such stolen goods are taken to the GR for "safe-keeping". In the ensuing confrontation, tempers often rise. This sometimes resulted in loss of property.

### *Intra-group Conflict*

This arises between two pastoral groups: that is pastoralist-to-pastoralist conflict. During the onset of the rains, long distance transhumant pastoralists, on their way from their dry season grazing, come through the Gayam GR on their way back to Katsina State and some parts of Zamfara State. This group is often very aggressive as they move rapidly through the reserve, grazing on whatever they can. The resident pastoralists are often on the look-out for this group. The "foreign" pastoralists are often confronted and sometimes prevented from utilizing the resources on the reserve. Pastoralists of Gayam GR claim they do avoid contacts with the long-distance transhumant pastoralists because, according to them, they carry unknown and debilitating diseases. In an attempt to restrain these pastoralists, a fight could ensue.

Sometimes the children of Gayam pastoralists engage in some argument/fight and the case may go beyond what could be amicably settled within the community. When law enforcement agents are invited by an aggrieved party, it could cause strained relationship between the two families and an opportunity is created for external exploitation of the pastoralists.



## Conflict Management

For the smooth running of pastoralist affairs and management of the GR, two committees are in place. They are: a) Functional Policy and b) Management Committees at both the State and Local level.

### *Policy Committee (at State level)*

The primary function is to formulate and define management policies and to ensure that the management committee is enabled to execute such policies. Specific functions include:

- A. Work out land tenure system and the form and conditions for issuing leasehold permits in the GR.
- B. Determine the selection criteria for potential/intending settlers.
- C. Approve/determine the management committee's composition and functions.
- D. Draw up and approve management plans for all grazing reserves in the State, e.g. farm plans for settlers of the reserve and infrastructure, in conjunction with NLPD grazing reserve development team where the reserve is included in the SLDP.
- E. Control measures over use and conditions for entering the reserve and to impose punitive measures on defaulters.

The committee is made of the following members:

- |  |             |
|--|-------------|
| i) Director, Ministry of Agriculture/Animal and Forestry Resources | (Chairman)  |
| ii) State Director, Livestock Services                             | (Member)    |
| iii) State Chief Veterinary Officer                                | (Member)    |
| iv) The State Chief Conservator of Forestry                        | (Member)    |
| v) State Chief Agriculture Officer                                 | (Member)    |
| vi) NLPD State Officer   | (Secretary) |
| vii) Branch Manager, NACRDB  | (Member)    |
| viii) State Grazing Reserve Settlement Officer                     | (Member)    |
| ix) Chairman/Representative of LGA where GR is located             | (Member)    |

### *Management Committee*

The primary function of the committee is to advice and assist the State Policy Committee on matters affecting the use and management of the Grazing

Reserve, control over settlers' activities and the enforcement of the grazing reserve regulations. Other functions include:

- i. Identification of potential settlers and
- ii. Recommendation of settlers for leasehold permits as stipulated in the grazing reserve regulations
- iii. Monitoring of the day-to-day activities of the reserve's users and those of other land users which shall include control of grazing, right over watering points and locations of users
- iv. Act as forum for discussing day-to-day implementation problems
- v. Make recommendations to Policy Committee on Management Policies
- vi. Discussion of Pastoralists' complaints, and
- vii. Any other functions that may be assigned to it by the Policy Committee from time to time

The composition of the Committee includes:

- Head, Department of Natural Resources (Chairman)
- Project Officer (grazing reserve officer) (Secretary)
- District Head of district in which GR is located (Member)
- The Ardo or Ardos in the District (Member)
- The LG Veterinary Supervisor (Member)
- NLPD District Officer (Member)
- Three (3) prominent leaders of settled pastoralists (Member)
- A representative of arable farmers of the District (Member)

Unfortunately, these committees have not been functional and have been of no effect in managing the GR and emerging conflict. It was in the light of the ineffectiveness of these committees that a local dispute management committee was constituted in 2004 with the Wakili, (a respected Fulani leader and traditional ruler) as chairman. The committee is made up of representatives of all the communities in the GR (including women), representative of the District Police Officer, representative of the District Head (*Hakimi*) and the grazing reserve officer. Our key informant claimed that most cases referred to this local committee were resolved at the local level. Only a few cases were referred to the District Head. About 85-95 per cent of the disputes were resolved of at the local level. This is an indication that local authorities and community leaders still have a lot of influence on the behaviour of their subjects. This could inform the basis for undertaking sustainable development in the GR. Any development intervention should

consult very closely with community members through a truly participatory development planning. This way the challenges and felt needs of all stakeholders would be better assessed to chart a course for sustainable development intervention.

### Evidence From Northeast and Northwest Transhumance Corridor

The case of the Gayam GR above mirrors to a large extent the national picture, especially with respect to pastoralists' felt needs and interventions required. Arising from the domination of the livestock production sector by the preponderance of pastoralism, is the inherent production contradictions faced by transhumant and agropastoralists in the northwest and northeast transhumant corridors. Recent field evidence (Gefu, 1996) shows that problems and challenges facing different categories of pastoral producers vary with production system being practiced. For *transhumant pastoralists*, the problem most frequently mentioned was the issue of conflict and watering points especially during the dry months (see Chart 7). Conflict has remained a major issue even among the settled agropastoralists as recent field data have revealed (Gefu, *et al.*, 2009; Gefu, 2009; Umar, 2009).

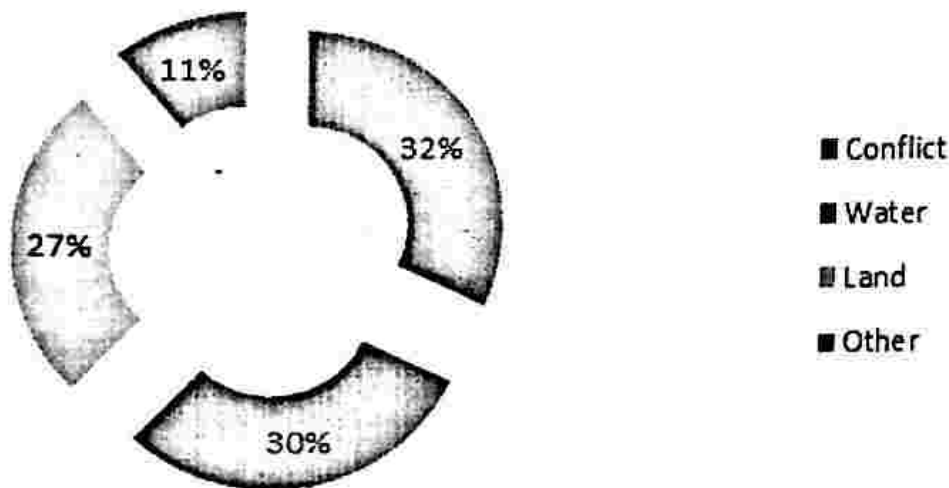


Chart 7: Constraints of Transhumant Pastoralist in Northwest and Northeast Nigeria  
 Source: Gefu, 1996 (Unpublished Data)

The problem has been recently compounded by the opening up of traditional dry season grazing haven for irrigated crop production. Crop expansion programmes and projects including *Fadama* projects seem to have contributed immensely to the conflict situation in many parts of the ruminant

producing zones of Nigeria. This conflict situation could be averted only if development projects were thoughtfully planned and implemented with the interest of all stakeholders adequately considered and taken into account in project documentation and implementation. The perceived problems as seen by this group of pastoralists have led them to suggest solutions the provision of clearly demarcated watering points and grazing land (Chart 8).

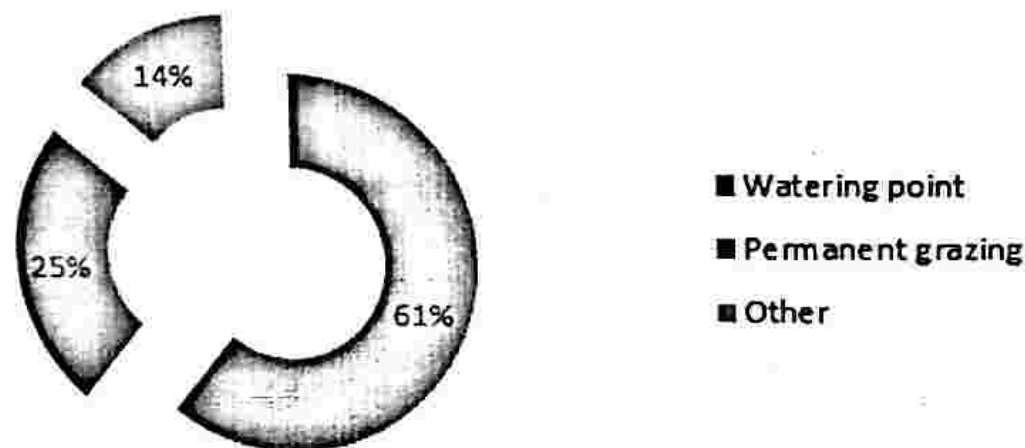


Chart 8: Perceived solutions to constraints identified by Transhumant Pastoralist in Northwest and Northeast Nigeria

Source: Gefu, 1996 (Unpublished Data).

The nature of the constraints confronting agropastoralists is different from those of their transhumant counterparts and derives essentially from their mode of production. During a survey conducted during the dry season and repeated in the wet season, a group of settled pastoralists (agropastoralists) were interviewed in the same way their transhumant counterparts were interviewed concerning constraints faced and perceived solutions (Gefu, 1996; Gefu *et al.* 2009 and Umar, 2009). For the agropastoralists, land constituted the major problem faced. Majority of them admitted that land constituted the single largest constraint to ruminant livestock production (Chart 9).

This is understandable because sizeable amount of land is required to maintain ruminant livestock in addition to land needed for crop production. Livestock producers, especially pastoralists still face an uphill task in securing either statutory or customary access to land. The little patches of land are often inadequate to support their livelihoods and in most cases they are compelled to reduce their herd and flock sizes. Animal disease ranked second in the list of constraints faced. It is interesting to note that the transhumant pastoralists did

not mention disease as a limiting factor. For the settled pastoralists, disease became an issue. Asked about what they believed was the way out of the problems listed, the agropastoral producers overwhelmingly mentioned the provision of land for both grazing and arable cropping (Chart 10).

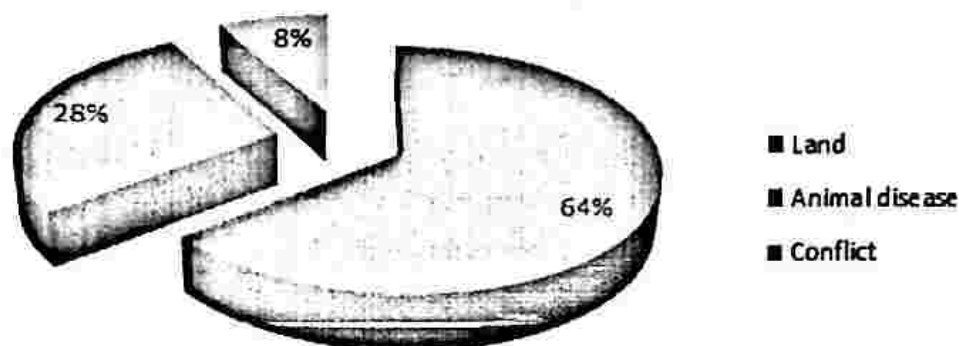


Chart 9: Constraints of Agropastoralists in Northwest and Northeast Nigeria  
 Source: Gefu, 1996 (Unpublished Data)

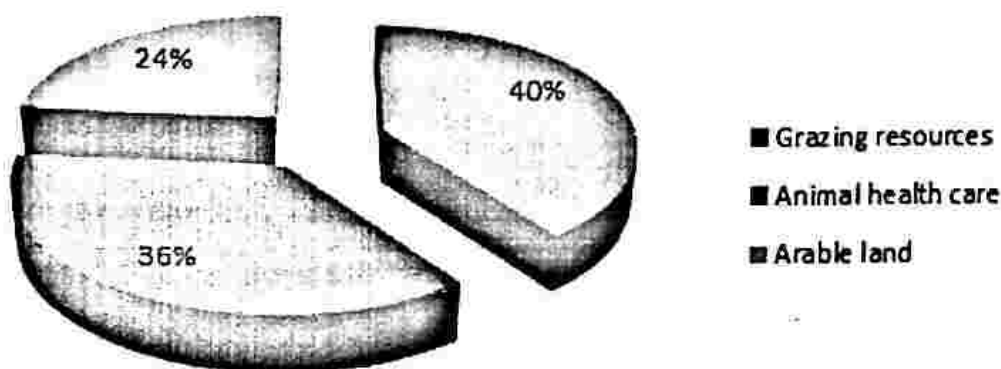


Chart 10: Perceived solutions to constraints of Agropastoralists in Northwest and Northeast Nigeria  
 Source: Gefu, 1996 (Unpublished Data)

**Feeds and Feeding**

Feed scarcity is one of the major constraints to ruminant livestock production in Nigeria and indeed the entire sub-region where ruminant livestock production is predominantly undertaken in the dry Sahel and Sudan Savannah

zones. Here, producers rely on natural rangelands and crop residues such as maize, millet and sorghum stovers, cowpea veins and groundnut haulms, rice straw and soy crop wastes. The importance of crop residues as animal feed in the region is growing rapidly with the significant decline in grazing areas due to increasing cultivation of marginal lands and fallows as a result of demographic pressure (Ramaswamy and Sanders, 1992). These feeds stuffs are sometimes supplemented with agro-industrial by-products such and grain offals (wheat, maize, sorghum and millet) and oil seed cakes (groundnut, soy, cotton seed) where available and affordable by the producer. Feeding of agro-industrial by-products are often in limited quantity in ruminant fattening operations and supplementation of lactating animals (smallholder dairying). Ram fattening is fast becoming an important economic activity especially among the rural and peri-urban poor and vulnerable groups because of low the initial investment, rapid rate of turnover, social acceptance and easy market access (Anyanwaie *et al.*, 2007).

Supplementary feeds especially crop residues are always provided on an *ad-hoc* basis and in an unregulated manner as animals are offered whatever is available and this leads to considerable waste, especially when feed availability is high, but when feed availability is low the animals are underfed (Sangaré, 2002; Fernández-Rivera *et al.*, 2005; Ayantundé *et al.*, 2007). The result of such practices is that the indigenous animals are often unable to express their full genetic potential. There is, therefore, delay in the manifestation of reproductive characteristics. To make ruminant livestock attractive to investors, it is imperative that it must be profitable and seen as a business. Profitability will, to a large extent, depend on feeding strategies and other management inputs.

A rapid meat and milk expansion programme will benefit from an articulated feed formulation based on fodder resources and crop residues, especially for small and medium operators. Smallholder fattening schemes and cottage dairy processing plants can be rapidly developed with a viable and systematic feeding programme. Presently, unlike in the poultry sector, there is no complete feed ration package available specifically for ruminant livestock production. Ruminant livestock producers should be able to walk into a livestock service center to pick a ready formulated feed package for any category of meat or dairy animal. The national and international research centres have a pivotal role to play in this direction. Communities can be encouraged to undertake fodder production on a commercial basis. Producer groups or individual entrepreneurs could be assisted with loans and logistic support for initial take-off. Hay, silage and browse plants may be included, depending on the animal nutritional requirements and scale of operation.

## Dairy Production Systems

The indigenous cattle breeds in Nigeria are basically beef animals. The Bunaji (White Fulani) cattle make up about 51% of the total cattle population of Nigeria. About 96% of all cattle in Nigeria are in the hands of pastoral producers mainly the pastoral Fulbe. It is this group that produces the bulk of Nigeria's domestic milk despite the low milk yield of the indigenous cattle breeds. Research has shown that local breeds are less productive than exotic ones. It can be said that, although local breeds are less productive, appropriate breeding schemes and management could greatly increase milk yields on a more sustainable basis (FAO 1990; FAO 2001; 2006). Also, the crossing of breeds within the indigenous cattle population could secure better production and adaptation to local hazards (Ndambi, *et al.*, 2007). A few private commercial dairy farms use exotic breeds with some modest results although this is not without bottlenecks associated with the fact that exotic cattle are less adapted to local conditions and are, therefore, more susceptible to diseases and environmental stress. This could hinder the animal from expressing its full potentials particularly in terms of milk yield. Furthermore, the need for specialized skilled manpower plus the capital-intensive nature of the investment environment are a major constraint to farmers, who in most cases do not have access to credit facilities and other production inputs and infrastructure.

At the national level, importation of exotic animals and semen has been liberalized to the extent that no control has been placed on the level of exotic blood injected into the national herd. At the moment, there is no national breeding policy to control limits for semen or livestock imports in order to preserve Nigeria's local animal genetic resources and bio-diversity. Some imported cattle breeds such as Friesians and Brown Swiss, and their crosses are also found in institutional and public commercial dairy farms. These farms, together with those operated by private commercial entities constitute the organized dairy farms and produce only a little proportion of the domestic milk and dairy products supply.

The industry, through commercial dairy processing plants and marketing segments, provides employment and value with huge but untapped potentials. Currently, very few of the known processing plants are operating. Those that are still functioning operate at less than 20% of capacity. At present, the market has been taken over by 'cottage' outfits that process and market yoghurt in urban and peri-urban areas using milk powder to produce yoghurt and other dairy products. The industry provides a means of livelihood for a significant proportion of rural pastoral families in the sub-humid and semi-arid

ecological zones of Nigeria. For instance, over 180,000 rural households derived some income from the dairy industry in 1986 alone (FAO, 1988). Dairying has been envisaged as a means to improve on the nutritional status and income generation from poor rural families (Dairying in Africa – Status and recent developments. O. A. Ndambi, T. Hemme and U. Latacz-Lohmann). This has led to the implementation of lots of developmental projects in favor of dairying by successive administrations in Nigeria, where different trends have been noticed in the dairy sector over the past years.

Due to population growth, land shortage and increasing interest in production and consumption, market-oriented dairy systems are evolving, with the use of high performing graded animals and/or higher inputs (Ndambi, *et al.*, 2007). The major driving force behind the development of the dairy industry is to improve on milk and dairy produce consumption especially by poor families (nutrition improvement) and to raise on-farm returns from dairy farming (income generation and poverty alleviation).

The dairy industry, through which better nutrition can be provided to the citizens, was given attention in various National Development Plans. In some selected areas, the government established dairy farms with local and imported breeds of cattle. In addition, milk collection centers including mobile collection points were established. These collection points were established to encourage the sedentarization of transhumant pastoralists. This way it was hoped that these pastoralists would be more readily accessed with improved production packages including supplementary feeding, animal health and management innovations as well as providing ready market for the highly perishable produce. Before independence in 1960, dairying in Nigeria was influenced by the colonial experience, which placed complete reliance on large government farms to meet the growing demands of the cities. Thus in the 1920s, the Veterinary Department established milk collection centers to process Clarified Butter Fat (CBF) from collections made from pastoral herds. This eventually led to the establishment of the first milk processing plant in Vom in 1939 followed by another in Kano, Zonkwa and Fada-Kaje in Kaduna State. After the colonial period, and as part of the government's strategy to encourage dairy industrial development, the federal, regional and/or state governments established several dairy-processing plants throughout the country. Milk plants and collection centers were established in other parts of the country including Bullasa, Runka, Maiduguri, Minna, Kano, Kaduna, Ilorin, Ibadan and Agege. The output of all these plants remained low and did not make any impact. After over four decades of government sponsored urban dairies, private sector investment in the industry has remained very low and often more interested in



export business rather than producing primarily to meet local needs and the domestic market. Due to inadequate supply of milk from producers, these plants soon folded up and so the milk and dairy demand deficit has continued to be largely met through importation of dairy products. The natural advantage offered by the clement weather in the Jos and Mambila plateaus as well as the Odudu area could not be advantageously utilized to support a viral dairy industry. The frequently cited reasons for closing down these dairy plants and collection centers include poor management and unaffordable market conditions (Fricke, 1979; Ajala, *et al*, 2006a).

Although these interventions may have had limited impact on the development of the industry in Nigeria, nevertheless there are lessons to be learnt. One such lesson is the creation of awareness of the need for dairy development as part of the overall efforts to improve on the performance of the livestock subsector. One of the direct results of this awareness has been the establishment of milk processing plants by both the private and public sectors, as a means of fast tracking domestic production. However, the availability of cheap imported milk powder in particular and other dairy products in general has created a disincentive for the development of a domestic dairy industry, particularly as the processing plants have completely neglected the appropriate pricing and milk collection aspects (Yahuza, 2001). EU- and US-subsidies are detrimental to most of the developing countries. Emerging commercial dairy farmers are progressively forced to give up milk production because of the high investment and running costs involved (Thomas Grupp, 2009). In some developing countries, people are moving away from dairy farming mainly because of high cost of concentrates which need to be fed to the crossbred cattle. Most of the communal grazing land no longer exists and the animals are to be reared under stall-fed conditions. To procure feed for them on a daily basis is costly as even in most of the times the poor quality agricultural byproducts are to be procured. The problem is also accelerated further by lack of quality veterinary care (Sandip Banerjee, 2009).

It has been observed that in order to promote the local dairy industry, some African countries tend to discourage the importation of milk and dairy products. The import situation could be worsened in subsequent years as the WTO globalization policies are aiming at a reduction in tariff barriers hence, imported milk and dairy products may become cheaper. Often, dairy policy instruments are put in place to meet specific fiscal, monetary, social and economic goals including the provision of urban consumers with dairy products at affordable prices; generation of revenues from dairy imports; reduction of the amount of foreign exchange spent on dairy imports; and

stimulation of dairy development, thereby generating income for producers and moving towards self-sufficiency in dairy products (Ndambi *et al.*, 2007). At present, Nigeria is the highest importer of milk and dairy products in Africa (FAOSTAT 2006). This position has been maintained despite import reduction arising from two ways: first of all, by government regulations on milk imports through restricted import licensing, prohibition of fresh milk imports and imposing of specific import duties on dairy products (Ngwoko, 1986), and secondly, after the devaluation of the Nigerian Naira (₦) in 2001, leading to a reduction in the purchasing power and subsequently a drop in importation of milk powder and butter oil (Yahuza, 2001). The domestic industry also faces difficulties like lack of feed, low milk yields, competition from imports, inefficient extension services, lack of inputs and low milk prices which discourage local production. From this experience we could conclude that, restricting imports can only successfully control importation if favorable policies and suitable resources are allocated to the promotion of domestic production.

For the dairy industry to thrive on a sustainable basis, it is clear that policies specifically aimed at attracting potential investors and relevant stakeholders must be put in place. Such enabling policies must be backed with necessary infrastructural and technical support system including research and extension support. Institutional and service support should be sought for from the various national and international research centres and technical partners. Here, the National Animal Production Research Institute, in conjunction with key relevant MDAs and others relevant NGOs must take the lead in spearheading the formulation and articulation of a national breeding policy.

### ***Public-Private-Partnership Initiatives***

A recent effort to boost milk production of smallholders was embarked upon in Vom. This is a Private-Public-Partnership arrangement in which MTN, NVRI, NAPRI and the IDF are collaborating to increase the milk yield of rural smallholder dairy producers through cross breeding of indigenous cattle with exotic bulls. The project is located in three states and targets pastoral communities. Seventy (70) Friesian bulls were distributed to participating livestock farmers in their respective communities. The project has mated 500 cows out of which 100 became pregnant (20% pregnancy rate?). Also ca. seventy (70) Friesian bulls have been distributed to farmers out of which 10 were lost and another 4 were retrieved due to disease infestation (dermatophilosis and cowdriosis). Although the project has reported modest increase in milk yield, it has also reported being confronted with a number of

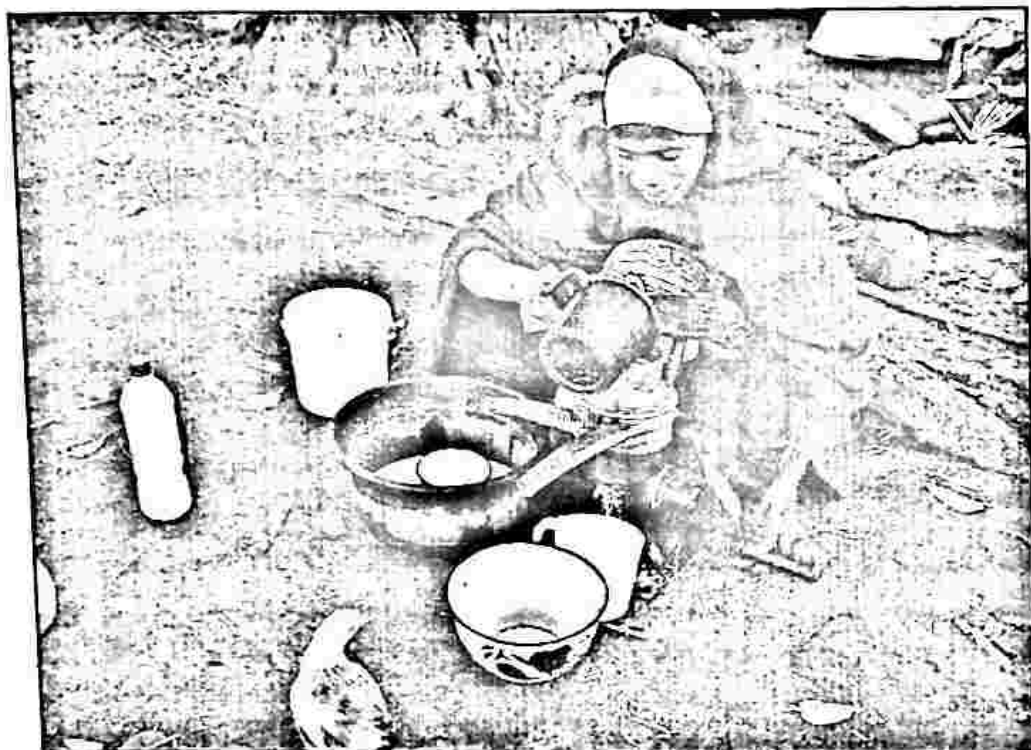
challenges which could limit the gains that could accrue to participating dairy farmers. These challenges include poor communication between participating farmers and project office, feed and water shortages in the dry season, endemic diseases (dermatophilosis -- *kirchi* and heart water) and problems associated with vaccine importation. These challenges are not unexpected. This is because the level of exotic blood used in the cross-breeding was on the high side. Considering the limited capacity of traditional producers to provide the needed inputs for effective and efficient management of the crosses (including health, feed, water, etc), the full range of potential benefits would be difficult to realize. Nevertheless, the initiative must be highly commended while the programme could learn lesson from this initial results.

On another front, consideration should be given recent concerns expressed with regard to effects of large-scale intensive livestock production activities on the environment. The environmental impact of intensive modern livestock production in developing countries is little documented. The impact of high-intensity, large-scale livestock production on the environment, particularly in terms of greenhouse gas (GHG) emissions, which has been in the spotlight in recent years, with estimates of agriculture's contribution to total emissions ranging from 18 to 51% (Scott-Thomas, 2009) need be ascertained, monitored and put under check before it reaches a crisis stage.

The concept of smallholder dairy schemes was initiated in the 1980s to stimulate local production especially of pastoral herds. Producers were to be assisted with credit in order to uptake relevant production enhancing livestock technologies including feeds, animal health practices and use of exotic/improved breeds of dairy cattle.

### *Smallholder Dairy Production System*

Traditional dairying consists of the production, collection, processing and marketing of fresh milk and dairy products. Pastoralists hold ca. 96% of Nigeria's cattle population and by implication supply the bulk of locally produced milk and dairy products. The pastoral herd is, therefore, the most important source of domestic milk in Nigeria. Pastoral women assume central importance in traditional smallholder dairying just as women have important labor roles in animal agriculture generally. Women and children are engaged in taking care of the animal as they are often responsible for tending/herding the animals, milking, processing and marketing of milk and dairy products (Waters-Bayer, 1985). The tasks of pastoral women in animal production are largely determined by culture and management systems. The major tasks of pastoral women include milking, processing and marketing.



A pastoralist processing milk (Cream and skim milk) at Wuro-Jauro, Bauchi State  
 Source: Courtesy: Gefu, J.O.)

To some extent the animal owners could influence milking decisions, but the ultimate control over milking is exercised by the milker (often women) who decides how much milk to take off the cow and how much milk is left for the calf. Essentially, therefore, the milker/woman takes decisions which influence milk off-take in terms of whether to milk at all, frequency of milking, time of milking and level of off-take during milking (Ajala, *et al*, 2007). The fresh milk is processed into various dairy products after discounting the portion earmarked for family use. Pastoral women utilize simple traditional methods (often labor intensive and energy sapping) to produce sour milk (nono), yoghurt (kindrimo), butter (maishanu), *cuku* (Fulani cheese) and *wara* (Yoruba cheese).

The sour milk, yoghurt and butter are usually sold in the homestead or nearby markets and the proceeds are at the disposal of the women. More income is derived from the sale of butter followed by yoghurt sale. Pastoral women often add some value to the sale of sour milk or yoghurt by adding some grain-base meal (*dambu* or *fura*). This is a whole diet meal commonly consumed by a large section of persons leaving and/or working in urban and peri-urban areas. Through their marketing activities, different dairy products

are made available to different consumers. The marketing channel describes the succession of markets through which the dairy products pass until they reach the final consumers. It is a decentralized type of marketing channel in which wholesalers and processors purchase directly from the producers. Generally, four distinct types of marketing channels can be discerned:

1. Producers → Consumers
2. Producers → Processors
3. Processors → Consumers
4. Distributors → Consumers (Ajala, *et al.*, 2006b).

The producer→consumer channel is controlled primarily by the agropastoral Fulbe women who process the liquid milk into the different dairy products. This is important because the bulk of dairy products is channeled through this system. The Producer-Processor channel involves the sale of liquid milk to processors who are often Fulbe women who either do not own dairy cows or produce limited quantity of milk. The producer may be selling to these local processors because they produce more than they can handle due to labor constraints. The Producers-processors channel is less important as the producers prefer to handle the processing themselves because of the value added to milk when processed to the different products. The Processor-Consumers marketing system involves mainly the producers who process the milk and sell directly to consumers, while the Distributors-Consumers channel involves wholesalers and retailers of dairy products. This is also a minor marketing channel in most pastoral marketing settings.. Most of these distributors sell in urban and peri-urban markets, thus making the channel a good supply link to urban populations. Dairy products are often valued in the way they are processed and presented for sale. Most times, preference is given to processing of whole milk rather than the unprocessed raw milk. Women derive higher income from sale of butter. They make between 12-15% more if butter is sold in the urban market. But this means that the women have to trek some distance or pay for transportation to the urban market.

During peak production period, glut is experienced and women have a huge challenge in handling large volume of milk during the rainy season when animals produce more milk. Because of their short shelf life dairy products are available only to consumers located within the reach of producers (within walking distance of Fulani settlements). For the same reasons these products are also more readily available in the northern part of the country than in the south. In some instances where the excess milk cannot be processed into butter or yoghurt or marketed promptly, milk waste is painfully experienced. This

pathetic situation arises from the limited processing capacity of producers as well as the poor cold chain and the very short shelf life of milk and dairy products. This calls for intervention in encouraging group formation amongst pastoral women and similar commodity groups, skills acquisition in the use of simple processing equipment, i.e. energy-saving devices for milk processing, maintenance of the cold chain, market access and indeed provision of rural infrastructure such as access roads and power. Smallholder groups, if well organized, can provide the much-needed dairy products to all segments of the Nigerian population.

The smallholder system is characterized with production process that involves the use of simple labour intensive devices which have survived generations. The quantity processed is thus limited by the technology available for use. Production is also limited to market outlet. Sale of dairy products is often limited to nearby outlets to which the dairy products are made available on a daily basis because of the perishable nature of the produce. There is a need to enhance the processing method to improve efficiency and reduce drudgery. Through participatory approaches, a thorough understanding of the pastoral economy and society within which dairying is embedded, must be known in order to make meaningful intervention in any system in use. This way development partners will effectively work with project beneficiaries to make the most appropriate decision. The most relevant intervention would be in the area of skills acquisition in the support of various rural livelihoods in dairying and non-livestock related activities. Support services and rural infrastructure such as portable water, power, access roads, etc. would be needed to take full advantage of development interventions.

However, a word of caution should be made in the light of recent experience in the formation of collection centers and smallholder groups. Dairy development requires considerable investment in equipment, skilled manpower for milk handling, processing and marketing, training and extension programmes for production associations/cooperatives. All these could be packaged and channeled through a well articulated extension service delivery system that particularly targets smallholder producers especially pastoral producing communities and groups.

### **Major Limitations and Constraints to Livestock/Meat and Dairy Development**

The livestock sub-sector is bedeviled with a mirage of problems ranging from socio-cultural to policy and institutional constraints. These include, among others, genetic and reproductive parameters, environmental factors including

inadequate and poor-quality feed, disease challenges, socioeconomic and cultural practices, government policies and programme priority, high population growth rate, which has driven demand for animal protein far beyond supply. A key factor in the ruminant livestock production equation is the issue of land within the context of access to grazing and watering resources by livestock producers, especially pastoralists (see also section on land issues).

### **Demography**

The problem of locally produced animals and animal products grew at the attainment of political independence and worsened as the years went by. This can be situated within the general framework of population and policy dynamics in the country. On the one hand human populations have continued to expand giving rise to higher food (of animal origin) demands without corresponding expansion in the supply chain, This has been further hampered by dwindling grazing resources occasioned by limited or lack of accesses of pastoralists to production inputs. Often times, the policies enunciated are at variance with the principles of good practices and good judgment.

### ***Low Yield and Value System***

The breeds of ruminant animals in Nigeria are slow growing, low producers and are kept under low input technology environment that prevent the animals from fully expressing their potentials. Ruminant livestock resources are primarily sustained on natural range with poor nutritional attributes. They are mostly kept under extensive systems in pastoral herds and flocks around village and peri-urban homesteads. These animals reach maturity weight at later age and therefore, reproductive characteristics are slow to manifest. As a result of poor nutrition and disease challenge (see feeds and feeding and animal health), meat and milk yields are low. Animal loose condition (and sometimes die) during the long dry season due to limited and poor quality of grazing and watering resources. Despite the feeding and watering challenges most producers face, they still prefer to maintain large animal numbers. This is linked with the value attached to animal number as an indices of social status and symbol of wealth. It is the usual practices, therefore, that pastoralists delay off-take of animals for reasons not only associated with value system, but also for economic reasons. When and if pastoralists are not convinced that they are getting value for their products, they do not hesitate to withhold sale until the price is considered right. Most livestock producers are, therefore, known to be less motivated to produce for the market as a result of poor market incentives and almost unavailable institutional support. Unlike their crop producing

counterparts, livestock entrepreneurs are hardly supported by government policies, programmes and institutional support mechanisms. The subsistent tendencies exhibited by most livestock producers, especially pastoralists, may have been informed by the high variability in the producer price for different livestock products over the years (Table 5). Consequently, the livestock sector has been unable to stand the challenge facing the country, which is to eradicate poverty and attain food self-sufficiency and food security, competitiveness and sustainable management of the environment through accelerated commercialization and investment in agriculture. To encourage better integration of pastoral products in the money economy price incentives need be put in place as well as emergency relief programme to cushion the effects of natural disasters like drought, floods epidemic disease outbreak, etc.

Table 5: Producer Price of livestock products (US\$/tone) (1990-2007).

Livestock type	1990	1997	1999	2001	2003	2005	2007
Beef (cattle)	2 580	6 582	1 526	2 618	2 371	2 863	3 674
Chicken meat	4 283	6 734	1 472	2 648	2 102	2 765	3 548
Game meat	3 229	12 107	3 001	2 853	4 178	6 948	7 822
Goat meat	2 573	5 917	1 339	2 451	2 063	2 582	3 332
Pork	1 951	4 637	1 418	1 600	1 727	2 114	2 574
Mutton	2 462	4 951	1 186	2 591	1 805	2 126	2 618

Source: Adapted from FAOSTAT, 2009

### The Climate Challenge

Agriculture is an important source of Green House Gas (GHG) emissions. Crop and animal farming has continued to be a significant contributor to climate change, as well as being a victim. Over time, the livestock sector has been singled out as a major player, responsible for up to 7,516 million metric tons per year of CO<sub>2</sub> equivalents (18%) of greenhouse gas emissions (FAO, 2006). A more incriminating assertion was recently made in a World Watch report to the effect that livestock and their by-products actually account for 51% of the annual worldwide greenhouse gas emissions (Goodland and Anhang, 2009). World Watch claims that the life cycle and supply chain of domesticated animals raised for food have been vastly underestimated as a source of GHGs, and in fact account for at least half of all human-caused GHGs (Table 6).



Table 6: World Watch: Uncounted, overlooked, and misallocated livestock-related GHG Emissions

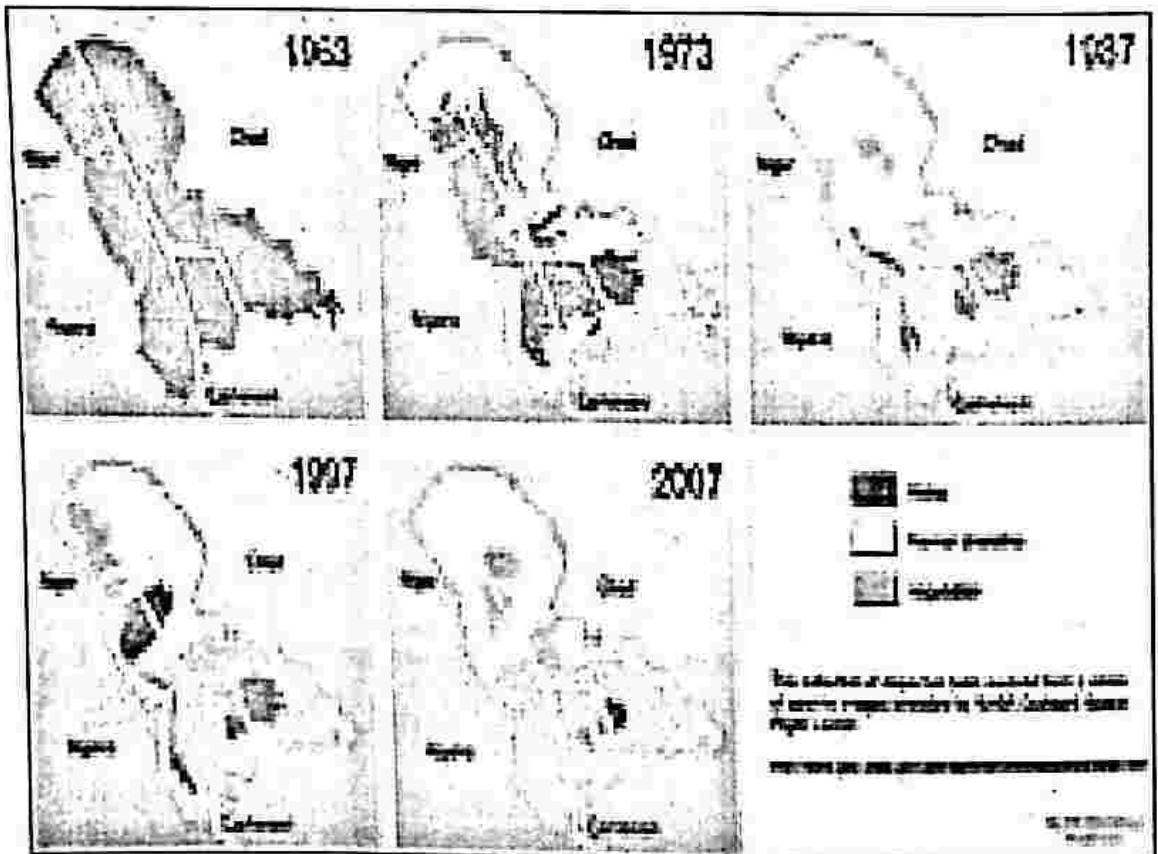
	Annual GHG emissions (CO <sub>2</sub> e)	Percentage of worldwide total
Million tons		
FAO estimate	7,516	11.8
Uncounted in current GHG inventories:		
1. Overlooked respiration by livestock	8,769	13.7
2. Overlooked land use	≥2,672	≥4.2
3. Undercounted methane	5,047	7.9
4. Other four categories (see text)	≥5,560	≥8.7
Subtotal	≥22,048	≥34.5
Misallocated in current GHG inventories:		
5. Three categories (see text)	≥3,000	≥4.7
Total GHGs attributable to livestock products	≥32,564	≥51.0

Source: [www.worldwatch.org](http://www.worldwatch.org)

Although these assertions are primarily relevant to livestock production systems in advanced countries where industrial mode of livestock production has been on large scale and grain-based, there are lessons to be learnt by developing and emerging economies that employ low-input technology in order to avert some of the adverse effects of industrial livestock production. Livestock emissions largely depend on how animals are raised and fed. Grain-fed, factory-farmed cattle emit higher total levels of greenhouse gases (combined with other environmental effects) than the grass-fed, low-input farmed cattle (van't Hooft, 2009).

The GHG emissions attributed to livestock production in industrial countries has implications for livestock production in a developing country like Nigeria and calls for pre-emptive measures against effects of climate change. As the bulk of ruminant production is under the grass-fed, low-input system, effects of global warming potent grave production setback for the Nigerian livestock farmer. Temperatures are rising and the rains are receding, thereby adversely affecting grass/fodder production, which constitutes the primary feed resource base. The climate challenge has affected Africa's pastoralists around the Lake Chad very adversely. The "tale of a disappearing lake" was posted by the UN Environment Programme 28 February, 2018, describing the

huge environmental disaster and conflicts precipitated by the shrinking of the Lake, once one of Africa's largest lakes (UNEP, 2018). It has been reported that in the last 60 years, the lake's size has decreased by 90% as a result of over use of the water, extended drought and the impacts of climate change resulting in massive loss in the size of the Lake from 26,000 square kilometres in 1963 to less than 1,500 square kilometres and still shrinking, destroying livelihoods loss of invaluable biodiversity (see map 3). The area had hitherto hosted variety of pastoralists, fisher folks and crop farmer who co-habited peacefully, providing important sources of food security and income. However, as a result of years of droughts and climate change many of the herders and fisher folks fled to other places.



Map 3: Lake Chad shrunk from 26,000 sq km in 1963 to less than 1,500 sq km in 2007

Global warming has been taking place for decades, but most governments have taken little or no action. It was only recently that the international community has been awakened to the grave dangers posed by global warming, which has been largely attributed to industrial activities around the world.

Stakeholders around the globe have started discussing ways of coming to terms with the climate crisis with the hope of charting a path to reverse the current trend. This culminated in the recent Copenhagen Summit on Climate Change in December, 2009. Although the Summit did not produce a legally binding accord amongst the 192 nations, a notable achievement can be said to be the raising of awareness on the dangers posed by climate change and the commitment to address the issue.

The climate crisis offers developing countries like Nigeria an opportunity to take a critical and holistic look at the livestock sector development strategies within the context of the environment and sustainable production systems. This brings to the fore the need to fashion livestock production policies and frameworks so as to improve on the smallholder production systems. An orientation in this direction becomes a matter of necessity if the disadvantages of the industrial mode of livestock production are to be averted in Nigeria and indeed Africa. This implies that the numerous smallholder producers would have a greater responsibility in providing the animal protein of the growing Nigerian population and, therefore, needs support in all spheres of the value chain. The need to support smallholder livestock producers has been aptly expressed as a way of exploring the potential synergies between food-security, adaptation and climate change mitigation (FAO, 2009). This support could come in the form of technical and financial backstopping from development partners and other stakeholders. Livestock farmers have to be assisted in sourcing seed stocks that would stand the test of the climate crisis. This means that a viable and sustainable breeding programme which takes into account the adoption of hardy and productive breeds will need to be put in place within the context of their usual production systems and responsive to unpredictable situation of droughts and floods.

In particular extension messages derived from farmer and environmental conditions must be readily available to livestock producers in remote areas on best and relevant livestock practices. Through a well-organized and funded extension system, different categories of livestock producers would acquire relevant skills to enhance meat and milk productivity and support livestock livelihoods and linking rural producers through value addition to high value markets in the vicinity and nearby peri-urban centers. A strong viewpoint has been expressed as a way out of the climate crisis to include the decentralization and diversification of livestock production and integration with crop production, which will reduce total GHG emissions by 5-9% (GRAIN, 2009). With the needed support to smallholder meat and milk producers in organized groups and communities, local transportation to market and buy food items,

especially perishable items like meat and milk, will be reduced. Similarly refrigeration period before sale or consumption will be drastically reduced or even eliminated as the food items are marketed and consumed fresh.

### **What Way Forward?**

From the foregoing, and derived information from the perception of intended beneficiaries of pastoralist interventions, the following general statements are made:

- a. Grazing Reserves (GRs) could be a key pastoral resource for both pastoralists and farmers. There could be a symbiosis between the two groups to fast track the transformation agenda with regard to food security.
- b. There is a plethora of reports on the pastoralist problematic. These reports span the various administrations. There is the need to harness the substance of these reports as actionable interventions can be sieved from many of the observations contained in these reports.
- c. As an important economic activity and significant source of national income and livelihoods support, sub-nationals (states and local governments) should be proactive in improving the livestock sector through meaningful interventions. The path embarked recently by the Kano State Government should serve as a wake-up call for other sub-nationals where livestock production is a major livelihoods activity.
- d. Pastoralists are enthusiastic and willing to contribute to the maintenance of public infrastructure within their community. A major challenge to development of the GR is the sense of insecurity expressed by pastoralists in terms of leasehold and unhindered access to grazing, water and farm land.
- e. The law establishing the GR should be enforced to guaranty settlers' leasehold so that meaningful investments, such as pasture development, could be made by settlers. In this direction, GR should be demarcated for the purpose of farm land allocation to genuine and deserving pastoralists with some form of security. This will not only encourage pastoralists to invest on the development of such land, but it would put to rest the incessant illegal occupation and encroachment of the GR.

- f. Poor extension contact with livestock producers should be addressed. The LGAs are uniquely positioned to deliver extension messages through the LGA Department of Agriculture. Extension personnel in the employment of the LGA can be trained to deliver livestock extension messages to pastoral communities. The thrust of extension services could start with nutritional requirements of different classes of livestock. Considering the present huge wastes and underutilization of crop residues, initial extension efforts should be directed to more efficient methods of utilizing crop residues for dry season feeding. There is abundance of crop residue produced on the GR which, if properly harnessed through proper modes of harvesting, storage and utilization, could be better feed to animals.
- g. The local system of conflict management adopted in several pastoral communities should be deepened and encouraged and supported by the Local and State authorities. This will facilitate quick resolution and prevention of imminent conflict at the level of the community.
- h. Facilities such as schools, water, veterinary and human health services should be made available to residents of the GR and its environs. These will go a long way in improving the standard of living of stakeholders.
- i. The communities that were in existence prior to the establishment of the GR (farming communities) should be officially recognized as enclaves and provided for in future plans to develop the GR. This will put to rest the vexed issue of "illegality" of the presence of these farming communities. There should be a public awareness campaign to educate members of the public on the utilization of GR facilities so as to prevent any further encroachment of the GR by unauthorized persons or groups. To this extent efforts should be made in securing and re-demarcating/beckoning the GR for purposes of enforcement.
- j. The GR should be demarcated and allotted to pastoralists along family lines. Such demarcation and allotment will ensure that allottees will protect and better utilize and managed patches of land so allotted for their use. This could stimulate pastoralists to engage in long term investment such as establishment of pasture and water.

## Solutions to the Problems

From the observations made above and derived information from the perception of pastoralists, the following statements are offered to provide building blocks for advancing the mutual interests of pastoralists and crop farmers in Nigeria:

- i. There is a need for Government to embark upon massive advocacy, mobilisation and sensitisation of members of the public to recognise the negative implications of conflicts and poor livestock productivity to the nation's economy, social wellbeing and economic development;
- ii. There is need to mobilise and organise the diverse pastoral communities to adopt improved techniques of livestock production. This will require permanent settlement, investments in land development (high yielding pastures, water), breeds improvement and investments in animal health care; also capacity building in relevant areas of livestock production as well as cooperative development, micro-credit financing and access to credit would be needed;
- iii. Grazing Reserves (GRs) could be a key pastoral resource for both pastoralists and farmers. There could be a symbiosis between the two groups to fast track the government policy on food security and attainment of some of the SDGs. Therefore, concerted efforts should be made to gazette and develop existing grazing reserves to ease the pressure currently put on grazing resources. There is the urgent need for Government to enforce the provisions of the Laws to meet the national projected target of allocating 22 million hectares within the next three years;
- iv. State Governments should strive to implement the 1988 policy that requires States to acquire, gazette and protect 10% of land for the purpose of pastoral production. In line with above, undertake a review of ALL past pastoral interventions in order to delineate LESSONS LEARNED in order to jump-start the needed white revolution (milk) process.
- v. As a pastoralist facility, GRs lack several basic amenities to which the pastoral communities are entitled as citizens of Nigeria. Just as much as crop farmers have access to basic needs as well as production inputs, pastoralists should be reached with

subsidies in terms of livestock production inputs and marketing outlets in such a way as to better promote livestock and crop value-chains.

- vi. Pastoralists are enthusiastic and willing to contribute to maintenance of public infrastructure. A major challenge to development of GRs is the sense of insecurity expressed by pastoralists in terms of leasehold and unhindered access to grazing and farm land. Government should facilitate secured land access for all persons concerned. The law establishing GRs should be enforced to guaranty settlers' leasehold so that meaningful investments, such as pasture development, could be made by settlers. In this direction, GRs should be demarcated for the purpose of farm land allocation to genuine and deserving pastoralists with some form of security. This will not only encourage pastoralists to invest on the development of such land, but it would put to rest the incessant illegal occupation and encroachment of GRs all over the country.
- vii. Poor extension contact with livestock producers should be addressed. The LGA is uniquely positioned to deliver extension services through the LGA Department of Agriculture. Extension personnel in the employment of the LGA can be trained to deliver livestock extension messages to pastoral communities. The thrust of extension services could start with nutritional requirements of different classes of livestock. Considering the present huge wastes and underutilization of crop residues, initial extension efforts should be directed to more efficient methods of utilizing crop residues for dry season feeding and feedlot activities. There is abundance of crop residue produced on the GR which, if properly harnessed through proper modes of harvesting, storage and utilization, could be better feed to animals.
- viii. The local system of conflict prevention and management (which is essentially a Local Plan of Action) should be encouraged by formalizing it to get the recognition of the Local and State authorities. This will facilitate quick resolution and prevention of emerging conflict at the level of the community. There should be broad based stakeholder engagement and participation in

mediating and resolving disputes and conflicts between pastoralists and farmers.

- ix. Facilities such as access roads, schools, water, veterinary and human health services should be made available to residents of GRs. These will go a long way in improving the standard of living of stakeholders.
- x. The communities that were in existence prior to the establishment of GRs (farming communities) should be officially recognized as enclaves and provided for in future plans to develop GRs. This will put to rest the vexed issue of "illegality" of the presence of these farming communities. There should be a public awareness campaign to educate members of the public on the utilization of GR facilities so as to prevent any further encroachment on GRs by unauthorized persons or groups. To this extent efforts should be made in securing and re-demarcating/beckoning all existing GRs for purposes of enforcement.
- xi. GRs should be demarcated and allotted to pastoralists along family lines. Such demarcation and allotment will ensure that allottees will protect and better utilize and managed patches of land so allotted for their use. This could stimulate pastoralists to engage in long term investment such as pasture establishment and water provision.
- xii. Undertake a comprehensive review of ALL land legislations with a view to harmonizing and streamlining them to better serve the needs of pastoral communities. Commission a State Coordinated Pastoral Resource Use Conflict mapping study to identify and monitor flash points.
- xiii. Embark on an initiative on Pastoral Development Programme (PADEP) akin to the ADP system: Start as a pilot programme in core pastoral areas in the State (e.g. Birnin Gwari and Kachia LGAs) , then scale out.
- xiv. Establishment of a Pastoral Emergency Relief Agency to handle all matters of pastoral distress (emergencies and disasters). This would be handy in the event of natural disasters like the recent flooding that rendered many pastoralists homeless and loss of animals. Early warning systems must be operationalised while



rapid response mechanism be adopted by all States and Local Governments in a fair and participatory manner

- xv. Non-pastoral initiatives should be responsive to pastoral interests especially resources that have been traditional heaven for pastoralists. This is with special reference to agricultural programmes and projects that acquire existing pastoral grazing resources without provision for alternative resources.
- xvi. Promotion of a private-public partnership (PPP) to provide critical resources (especially feed and water) particularly during the hungry months (dry season).
- xvii. Compel livestock companies to contribute 10% of income earned (on products and services) into a fund to be named pastoral endowment fund. This fund could be channelled into the provision of infrastructural amenities for pastoral communities.
- xviii. Sponsor an Executive Bill to the National Assembly on Pastoral Resource Use and Conservation to be integrated into a national legislation in support of the overall needs and realities of pastoral communities in Nigeria.

Government action can be geared towards providing a more favorable investment climate including investment incentives such as tax holidays, special concessions to attract investors to the sector, especially in the dairy and meat processing value chains.

## References

- Aboyade, O. (1972). Resource administration and national economic development. Invitation address to the Seminar of the Commonwealth Association of Surveying and Land Economy, held in University of Ibadan.
- Joda Ahmed (2003). Perspectives of pastoralists for livestock development in Nigeria. Memo submitted to Presidential Committee on Livestock – Sub-committee on grazing reserves and cattle routes development.
- Ajala, M.K. and Gefu, J.O. (2004). Socio-economic factors influencing small ruminant management practices in Giwa Local Government Area of Kaduna State, Nigeria. *Moor Journal of Agricultural Research*, 2(1): 55-62.
- Ajala, M.K., Gefu, J.O. and Mohammed, A.K. (2004). Constraints associated with small ruminant production in Giwa Local Government Area of Kaduna State, Nigeria. *Tropical Journal of Animal Science*, 7(2): 15-21.
- Ajala, M.K., Otchere, E.O., Gefu, J.O. and Ehoche, O.W. (2006). Enhancing the quality of rural life: The case of dairy production in Nigeria. *Nigerian Journal of Rural Economy and Society*, 3: 48-57.

- Dorner, P. (1964). Land tenure, income distribution and productivity interaction. *Land Economics*, Vol: 40: 247-254.
- ECOSOC (2007). Land Policy in Africa: Securing Rights, Enhancing Productivity and Improving Livelihoods ECOSOC Ministerial Roundtable Breakfast Roundtable 4 July 2007. Geneva.
- Famoriyo, S. (1979a). Private and public ownership of land in Nigeria. *Nigerian Journal of Political Science*, Vol.1 No. 1: 7-19.
- Famoriyo, S. (1979b). Land tenure and agricultural development in Nigeria. University of Ibadan Press.
- Gefu, J.O. (1996). Conflict in resource use: Experiences from an irrigation project. Paper presented at the IUAES/IGU Congress 'On Livelihoods from Resource Flows. Institute of Tema Research, Environmental Policy and Society (EPOS), Linköping University, Sweden. August 19-22.
- Gefu, J.O. (1998). The pastoral problematic: Retracing the missing link. In: Hoffmann, I. Prospects of pastoralism in West Africa. Tropeninstitut, Justus-Liebig-Universität, Giessen, Germany, pp. 10-20.
- Gefu, J.O. (2004). Endogenous research for development in Africa. Invited paper prepared for the Inaugural Conference of Alexander von Humboldt Research Foundation Club (Nigeria Chapter) holding at Ibro Hotel, Abuja, 29th November – 2nd December, 2004.
- Gefu, J.O., Alawa, C.B.I. and Maisamari, B. (2008). The future of transhumance pastoralism in West and Central Africa: Strategies, dynamics, conflicts and interventions. Proceedings of the International Conference on the Future of Transhumance Pastoralism in West and Central Africa held at the National Centre for Women Development, Abuja, Nigeria, November 21-25, 2006. National Animal Production Research Institute, Ahmadu Bello University, Zaria, Nigeria. ISBN 978-2741-08-6. 327pp.
- Gefu, J.O. (2009). Socioeconomic Survey of Gayam, Bobi and Lata Grazing Reserves.
- HLPE (2011). Land tenure and international investments in agriculture. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome, 2011.