

## FULANI PASTORALISM AND THE PROBLEMS OF VETERINARY DELIVERY SERVICES

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Since Nigeria has found it necessary to give a high priority to disease control as a factor increasing livestock production in general, and since the success in the field of disease control has been very encouraging, the time has come to look at the traditional pastoral organization and the role our veterinarians should play in bringing their services nearer to our pastoral communities.

The need to extend adequate and effective veterinary services to our pastoral communities is an issue that must capture our mind. First, 90% of the cattle population in Nigeria is under pastoral control and are still being kept under the traditional husbandry practices. Second, the communities belong to our grass root population who still live in close contact with nature and are so much dependent upon the changes in the ecosystem in which they wrest their subsistence.

The major issue now is how to extend effective veterinary services to the pastoral population without upsetting the existential game they play in their natural environment. If the objective of extending veterinary care is to improve the quality of our livestock, it is important that we have adequate understanding of the management skill and the animal health problems facing the pastoral population. In my mind, the success of our livestock improvement problem depends upon the recognition of the relationship of the two variables mentioned above. The main point here is that the problems of extending veterinary services is not that of technology as such, but also understanding the social and cultural dynamics that are involved if the services is to be effective, especially when government agencies

are dealing with people who have had only tenuous relations with such agencies.

I must emphasize, however, that in retrospect the veterinary division of MANR has done a great deal with disease control and livestock improvement programs, particularly in areas such as breeding, feeding, management and animal health problems. Under these schemes, animal welfare clinics involved in routine deworming, vaccination against rinderpest, bovine pleuropneumonia, black quarters, Anthrax, contagious abortion in cattle and eradication of tsetse fly have been carried out with some success. By the same token, mineralized salt licks, water, supplementary feeding of groundnut cakes, cotton seed and other high protein feedstuffs have been provided. However, from all indications the activities of our veterinarians seem to have over concentrated on research dealing with the curative aspects of animal health problems, while the preventive side seems to have lagged behind.

On the whole, however, conditions of the Fulani system of cattle keeping under the traditional settings are being neglected. The neglect is partly due to the veterinarians not possessing adequate knowledge of the management skills of our pastoral communities (essentially the type of activities our herders carry out in the diverse ecological settings they inhabit). This is not to say that our veterinarians whose responsibility includes carrying out veterinary services to our pastoral people have little perception of the complex human difficulties involved. They want change, but have very incomplete ideas of the cost to the way of life of our untie population. Innovation,

generally, is a combination of technical and human factors rather than a purely mechanical matter and apparently, a gap has been created between these innovators (veterinarians) and the acceptors of the innovation (the pastoral communities). Such a gap has underscored efforts to improve the objectives which should be achieved and which the extension services of MANR stand for.

I intend to show that a thorough understanding of Fulani pastoral movements and the ecological periods they follow, with the various activities associated with the two, are crucial to the planning and execution of the veterinary services. The genesis of this paper is based on the assumption that for our veterinary to establish an effective base for the services they provide to the system of traditional husbandry practice, an understanding of the social and cultural dynamics that are associated with technological innovations are essential. Changing people's customs is a more complicated responsibility than surgery. In this paper therefore, we will discuss the salient features that characterize Fulani herding organization within the ecosystem under which they wrest their subsistence. In the conclusion an attempt will be made to suggest ways in which our veterinary can improve the quality of services they provide. Materials on which our suggestions will be based was collected during the field work I carried out among the semi-sedentary Fulani of the Jos Plateau in 1974/75.

#### SEASONAL DISPLACEMENT

Like other pastoral groups in the Nigeria savannah belt, seasonal displacement is also an essential features of the Fulani of the Jos pastoralism. However, it could be said to an extent that Jos environs is an exception to the general seasonal displacements that one finds among other pastoral groups because of the reduction in seasonal movement. Among the Jos Fulani, seasonal

movements are restricted primarily to the nearby valleys and hills, except for the latter part of the dry season (December to April) when they move down the plains of Antor in Gwanto district, Jama'a province, North-Central State, Nigeria. This in part is due to the amenable guinea savannah climate, which is much more pleasant than that of the surrounding savannah belt with rainfall varying from 45 to 60 inches.

Seasonal displacements in the dry season involve the participation of an entire household, or only part of it, depending upon the nomadic status of the household involved. The distance from Jos to the dry season grazing camps in Gwanto varies, depending upon the location of each pastoralist homestead. At the time of the research period there was considerable migration of the Fulani from different locations in Northern Nigeria. Migration to this area is a function of the availability of fodder resources and water supply and normally starts from September for those other than the Jos Fulani.

In Gwanto and the surrounding areas, the stubble of millet and sorghum on the farms is an attraction to the Fulani and is usually available to both the nomadic and semi-nomadic Fulani immediately after the harvest season is completed in December. Other crop residues, such as cotton, cowpeas and peas, on which the cattle depend after the millet has been grazed, are available to the cattle from January to February. Young shoots of grass start to germinate after the farmers have burnt the dry grass, especially the *Hyperrhenia rufa*, in preparation for the growing season at the end of April. This then provides browsing for the cattle during the height of the dry season in March and April before the Fulani return to their permanent homestead.

Although Gwanto provides ideal grazing for the Fulani during the critical dry months of the year, no attempts have been made to settle there permanently as

they have done on the Jos Plateau, thirty-five kilometers away. The rationale here is just because during the wet season the area is highly infested with tsetse and other flies that are harmful to the cattle. Immediately after weather conditions change and the flies move further south, the Fulani herdsmen move into Gwanto. Also, because Gwanto possesses dry season grazing opportunities, the area has become one of the traditional grazing grounds for the Fulani from Jos, Bauchi, Zaria Kano and Sokoto.

Whatever we may designate as the prime factors influencing Fulani decisions and organization of grazing activities during the critical period of the dry season, some of these factors will be identical to all the various groups of Fulani who migrate from the areas listed above. A common characteristic of the areas they exploit is the uneven distribution of fodder resources. Fulani herdsmen are therefore forced to move their camps constantly as the only protective measure in the interest of their cattle.

Although, admittedly, movement is an integral part of Fulani pastoralism, such movement may sometimes be inhibited when the cattle begin to lose weight progressively, and as such are susceptible to endemic diseases. Apparently, one protective measure is to minimize the grazing orbit within the radius of their camps. Such restrictions are highly valued as part of good husbandry management. When the cattle are allowed to graze too far away from the camp, they tend to exhibit tiredness by the time they return to the corral. For some pregnant cows, this can easily cause miscarriage (due to an intake of non-nutritious feeds) and also make them susceptible to diseases. This is another influencing factor causing the timing of movements to be in sympathy with the welfare and herding priorities of livestock. Such timing and organization of livestock priorities are determined by Fulani traditional husbandry practices on the one hand, and by the ecological

periods Fulani herdsmen follow and the range of Fulani adjustments to the ecology of the area, on the other.

It is essential then for the veterinarians to have adequate knowledge of Fulani traditional ecological divisions of the year for an analysis of their pastoral activities, their adjustments to the feeding requirements of their cattle, the constant changing demands of the habitat they exploit, and the disease conditions to be discussed. We will now discuss the activities associated with the ecological factors listed above. This will be dealt with within the framework of the ecological periods and herding organization of the Fulani.

#### ECO-PERIOD AN HERDING ORGANIZATION

In accordance with the climatic reality of West Africa, the Fulani divide the year into two seasons, the wet (*Ndungu*) and the dry (*Cheedu*). In broader terms, the 'wet' and 'dry' seasons simply indicate the climatic periods in which adequate amounts of rain fall to produce an abundance of high quality grass that characterizes the savannah belt vegetational cover during the wet season, while the dry season produces insufficient rain fall to maintain the vegetational cover of the wet season.

Since the ecological conditions by which the Fulani divide the year are likely to fluctuate considerably from season to season, a simple equation of wet and dry can easily blur the reality of Fulani pastoral life. In recognition of this fact the Fulani divide the wet season into three eco-periods: *seeto* (early wet season), *seeto luginni* (mid-wet season), and *ndungu* (wet season proper), while the dry season is broken into three also: *Yamde* (early dry season), *Debunda* or *nyalle* (mid-dry season), and *cheedu* (dry season proper). These divisions are also a recognition of Fulani yearly pastoral organization, the environmental and disease factors of the savannah. The periods also

portray an approximation of the ecological changes that are part of the wet and dry season systems (see table 1).

### SEETO-EARLY WET SEASON

*Setto* begins with the stormy period preceding the rainy season in April. This period is normally associated with a number of thunder storms and a rapid increase in temperature and humidity. During *setto*, the rain falls in localized heavy showers which gradually become widespread before the end of May.

Conditions are generally critical, not only for the Fulani pastoralists, but also for the native farmers with whom they share the environment since both anxiously await more rain. For the farmers, this period signifies the beginning of the planting season while for the Fulani pastoralists, it signifies hardships and property risks because the early distribution of new grass is influenced by the regular distribution of rain. It is during this period that the mortality rate among the cattle can be very high due to lack of feed and exhaustion from long treks each day in search of grass. Also, due to the unhindered movements of all cattle, it is impossible to avoid contagious diseases. As a matter of fact, the term *setto* may imply all the risk that that period entails.

During the *setto* period camp displacements are an integral part of Fulani pastoral organization. Camps can

be dis-membered at any time if the heads of the households (cattle camps) gather information in the market about a location where rain has previously fallen. In this situation the herdboys are quickly dispatched with a part of the family herd to those areas. The entire household may also decide to move to the area after the herdboys have departed. As a result, no permanent huts are ever built during this time. The traditional wind screens are used as whelters, since pastoral encampments are expected to be temporary.

As the *setto* period progresses into the month of May the hardships and tensions of constant moving in search of grazing resources diminish. This is the period in which the Fulani begin to move towards their permanent homesteads. This is also the period when Fulani cattle begin to regain weight lost during the dry season, and by the time *Setto luginni* begins the cattle have completely recovered.

*Setto* co-incides with the time when farms are being prepared for the planting season, therefore, the Fulani pastoralists can easily find grazing areas for their cattle. This is also the time that the relationship between the Fulani and the farmers become very cordial because the cattle helps to fertilize the farm plots before the onset of the planting season. At this time, it is much easier for the farmers to find some Fulani who will voluntarily camp on the farms, sometimes without prior per-

TABLE

#### *Ecological Time Table of the Fulani of Jos*

<i>Climatic periods</i>	<i>Eco-periods</i>	<i>Fulfulde terms</i>	<i>Approximate time of the year</i>
WET (NDUNGU)	Early wet season	Seeto	April, May
	Mid-wet	Seeto	June
	Wet season proper	Ndungu	July, August, September
Dry (CHEEDU)	Early dry season	Yamde	October, November
	Mid-dry season	Debunde or Nyaile	December, January
	Dry season proper	Cheedu	February, March.

mission. For those Fulani who want to farm and who have moved away to the dry season grazing camps must return before the end of May to prepare their farmland for the planting season.

The Fulani regard *seeto* as the luckiest time of the year and believe that anything done then will be a success. *Seeto* is the time for most cultural activities, and often, celebrations which would normally fall outside the lucky months are deferred until this time. It is also important for those who want to give their cows medicine for reproductive purposes to wait until *seeto* sets in before doing so.

Of the recorded diseases that directly impede cattle reproduction performance, *samore* (trypanosomiasis) is the most prevalent and, in fact, it is the major disease the Fulani claim affects the performance of their breeding cows. In other words it is prevalent during the early wet season (*seeto*) period due, perhaps, to the constant movement that are part of their pastoral organization.

#### SEETO LUGINNI

*Seeto luginni* is the transitional stage from *seeto* to *ndungu* (wet season proper). The distinction between *seeto* and *luginni* is based purely on the activities and pastoral planning the Fulani are engaged in during these periods. The term is used to denote the initial abundance of grass for the cattle, especially in the first three weeks of June when rain is expected to fall every day.

For some Fulani households, *luginni* is the mating and calving season, and the period in which they plan for long term pastoral management. The Fulani know from experience that a drought may occur at any time and consequently, attempts are made to increase the herds to their maximum during years of surplus rainfall. In this respect, native medicines for reproductive purposes are given to the herds on a regular basis. When I was carrying out field research in Jos, there was a peak calving season towards the end of

*seeto* (in May) and the beginning of *luginni* (in June). This period also signifies the beginning of Fulani pastoral movements back to permanent homesteads and the end of planting season for the farmers.

The Fulani who do not farm but who have a *setirnrde* (early wet season grazing camp) must make sure it is cleared of cow dung as a protective measure for the calves. This procedure is essential because young calves may be allergic to cow dung and failure to have it removed may result in the loss of calves. The dung is cleared either by burning or by removing the pellets for safekeeping before the rains begin. A great deal of attention is given to the calves, especially those between the ages of one and three months because of the continuous downpour of rain throughout the three weeks of *luginni*. When the heavy rains begin the calves are moved quickly to the *hurgoru* (head of the camp hut) where a fire is kindled to keep them warm. Strict precautions must also be taken to keep young calves from entering pastures for the first three months after their birth. This is to protect them from the incidence of contracting *nyalbi*. *Nyalbi* (stagger disease), according to the Senior Veterinary Superintendent in-charge of Jos clinic, is contracted by the calves when they feed on pastures which contain the egg or cyst of a tape worm (*teania multiceps*). The eggs or cysts find their way into the pastures through the feces of dogs that host the parasites, and when rain falls, the eggs are dispersed rapidly onto the pastures. According to the Fulani *Nyalbi* causes heavy casualties among the calves. *Goli* (enteric parasites) is another disease common during *seeto luginni*.

At this time of the year (June), conflict situations normally develop between pastoral groups and the farmers for access to the pastures. Charges of crop damages from the farmers are rampant because the crops have started to grow and the farmers are threatened by the constant movement of cattle near their farmlands.

This make herding very difficult because the croplands have to be constantly avoided. Generally speaking, this is the beginning of the hardest times in Fulani pastoralism, especially for the herdboys who have to stay with the cattle, no matter how heavily the rain falls. According to the Fulani calculations *luginni* is only one month (June); by July new eco-period the *ndungu*, begins.

#### NDUNGU—WET SEASON PROPER

By the time the *ndungu* period is fully under way, the Fulani who have participated in the dry season migrations are expected to return to their permanent homesteads.

According to the Fulani ecological calendar, the wet season begins in July and extends through the month of September. The principal ecological characteristic of the *ndungu* period is the abundance of pasture areas with high quality grass for the cattle. For example in the Gashish district in Jos Division, the vegetation cover from the beginning of June to September, is very adequate. From the inception of *seeto luginni* in June, herding activities are gradually shifted from the lowlands and depression areas to the highlands and some parts of the plains. By the middle of July, these areas (highlands, hills and plains) witness a heavy concentration of cattle, while the *chedirde* (dry season cattle camps) in the lowlands and depression areas become deserted. In fact, from the beginning of July, the lowlands become soggy from the accumulation of rain water. Also, the danger of bovine infection and poisonous snakes is greatly increase.

The main difficulty throughout *ndungu* is the physical hardships suffered by the herdboys and the cattle. The herdboys are in danger of getting cold and wet or being bitten by snakes as they move from one grazing areas to another, while the animals sometimes suffer from an excessive intake of wet grass. As a precautionary measure the cows are taken to

graze after 9.30 a.m., when most of the dew and excess water have evaporated. Also, since wet grass tends to decrease the amount that the animals eat, *kanwa* (sodium), is given to them three times a week to sharpen and improve their appetites. These precautionary measures are regarded by the Fulani as an essential part of good husbandry practice.

At the height of the wet season proper, the cattle corral camps must be shifted constantly because of the accumulation of dung in these corral. The corrals may be moved to different locations more than six times before the onset of the following eco-period.

Generally, the *ndungu* period can best be described as a maximum resource — use period of high capital accumulation in Fulani husbandry practice. The potential for a herd to increase in size is substantial because of the favourable grazing conditions. Also because the grass is lush, lactating cows yield an abundance of milk. During *ndungu*, the judicious herd management of the Fulani emphasizes the maximization of herd size and the methodical restriction of cattle disposal as an essential measure to counteract any unforeseeable cattle loss or catastrophe that may occur during the future dry season. The Fulani usually wait for this period before selling the cattle normally sold to maintain their domestic responsibilities. There are also fewer tensions between them and the farmers.

The local authorities collect cattle tax (*Jangali*) during *ndungu* normally in early August. Towards the end of the same month a cattle immunization programme is carried out by veterinary officials as a measure against contagious diseases.

At the beginning of *sumaeru* (October), the amount of rainfall begins to decline and the grass on the hills and escarpments gradually dries out. This marks the end of *ndungu*; and the beginning of the hot period (the dry season).

**YAMDE—EARLY DRY SEASON**

This period can best be described as the late wet season or the beginning of the dry season. It is the period in which the rainfall starts to decline and the hot sun begins to appear and increase in intensity. This period also coincides with the harvesting period when both human and livestock food stuffs are in abundance.

For the Fulani, the initial planning of when and where to move normally begins around the end of *saboyel* (September). The heads of households must undertake reconnaissance trips (*wossoye*) to the areas where they intend to spend the dry season.

Many precautionary measures must be undertaken in planning the seasonal migration, the most important being the selection of routes to be used. The routes must have an adequate supply of grass for the cattle as they moved towards the dry season camps since the trip involves a long trek. As a counter measure, those who live a great distance from the dry season resorts usually start movement at the end of September. Such movements may take a week or more before the final destinations are reached.

The beginning of the dry season and the end of the harvesting period of one of the principal crops (maize) in Gwanto coincide with each other, thereby allowing the cattle to graze on crop residues. At the same time, the areas that turn into swamps during the rainy season gradually dry up and new grass begins to appear. Such conditions constitute excellent attractions for the Fulani herdsmen who gradually move their *chedirde* (dry season cattle camps) into these areas. However, for those who calve during November and December, or for those who want to look for more nutritious fodder for their cattle, late November is the appropriate time to move towards Gwanto. If, on the other hand, the households involved are engaged in agricultural activities around their homesteads, such moves are never made until early December, after they have

harvested their millet and the stubble has been grazed by the cattle.

One of the months of *Yamde* (November) is also considered to be a lucky month in which marriages are contracted, inheritance matters are settled, cows are handed over to children and women go to their matrimonial homes. The period of *Yamde* ends with the beginning of the cold harmattan of *debunde*.

**DEBENDE—MID DRY SEASON**

*Debunde* coincides with the cool period at the beginning of December when the effects of the *Harmattan* from north-east Africa are felt in Northern Nigeria. This condition is more acute in the up country (Kano, Sokoto, Zaria and Bornu) than in the southern areas, especially those that lie within the watersheds of the three major river systems of Nigeria, within the forty to sixty-five inch rainfall belt. Gwanto has the advantage of lying within this range and hence attracts the majority of the migrating Fulani.

In the *debunde* period grass and fodder become scarce. As a result, the cattle must depend upon grazing and browsing along the river beds. Crop residues and stubble on farmlands are also important to the survival of the cattle. This period may sometimes be prolonged to the middle of February before the proper hot season takes over.

Due to the agricultural activities in the area, the Fulani are forced to occupy the lowlands at the foot of the hills that separate Jos Plateau from north-central state during the initial stage of their encampment. They will remain in this area until the middle of December, when the search for millet (*Karmamu*) and crop residues begins. However, those who arrive early in October usually have an advantage of grazing inside the maize farmlands that were harvested at the end of September.

On an unspoken contract involving the exchange of dung for stubble and crop residues, Fulani are free to build their

At this time also, the milch cows are not milked every day, but three times a week, or even less often depending upon the condition of the lactating cows and their grazing resources. If nutritional stress is very high a family may go for a week or more without any dairy products in their own meals. The Fulani believe that excessive milking during this time will make the cows more vulnerable to disease and extensive weight loss, which will later affect their reproductive performance.

One practice that must be stressed is the mating control to reduce the birth of weak calves which may not be able to survive the normal risks of the dry seasons. This control is practiced more often by the Fulani with cattle whose peak calving period falls within the drought periods, or immediately after the dry season.

As the grazing situation becomes unbearable because of the general fluctuation during the dry season, the composition of the Fulani camps becomes unstable. Members of each household become more independent in their behaviour towards the welfare of the livestock. The head of a household will move at a moment's notice to another area where he feels he can acquire more grazing opportunities.

I must point out that Fulani herdsmen never encourage large camps, especially during the dry season. Large camps are believed to cause early overgrazing and do not permit the Fulani maximum resource-use of the grazing facilities. Moreover, in case of an outbreak of livestock disease, larger camps have a tendency to lose more cattle due to the close contact of the animals.

Towards the end of *cheedu* the heads of households must travel back and forth to the market continuously to meet Fulani from other camps in order to gather important information about locations where rain has previously fallen. As the month of April advances, the Fulani know from experience that *seeto* is in

sight and a full calendar cycle has been completed.

### PROBLEMS OF VETERINARY DELIVERY SERVICES

Having discussed the salient features of livestock management practices of the pastoral Fulani, and the ecology under which these practices are carried out, our objective as stated in this paper will not be complete without looking at the roles the extension arm of the veterinary department should play before their services can become meaningful to the Fulani. Before I deal with this aspect however, I will re-emphasize the need to give a high priority not only to disease control as a factor in increasing better livestock production generally, but also, the necessity to complement veterinary services with adequate provision for health education in basic principles of environmental sanitation and personal hygiene. This is in accordance with the preventive aspect of general health services to our pastoral population. And as I have indicated earlier, this area seems to be lagging behind the curative side of health services. In saying this I am quite aware of the logistic problem the above will pose to our veterinary experts, especially when dealing with part of the rural grass root population. Notwithstanding, such logistic problems become even more prepared because of the nature of nomadic movements on the one hand, and the existing veterinary manpower resources that can be used to cope with health services problems, on the other. In addition is the problem of consumer recognition of the desirability of the extension services itself. These are the social facts that I consider to be limiting to the existing veterinary services.

I have pointed out that the logistical problems are not difficult to perceive given the nature of nomadic pastoralism of the Fulani. For example, one can accurately predict the deployment and displacements systems of our pastoral

population in the diverse ecological setting they inhabit with reference to the ecological condition discussed above. During the critical months of January, February, March and April Fulani pastoralism normally witness a series of unavoidable nutritional stresses. As a result the late period of the dry and early wet season are demographically characterized by constant displacements since water and pasture are limiting to livestock feeding habits. In other words, Fulani pastoral organization is unstable and flexible, during this period, whereas the mid-wet to early dry seasons will normally witness nomadic congregation in areas where abundant fodder resources are available. Due to this factor the Fulani are forced to remain at a predictable place for a considerable period of time. In other words they are demographically stable and predictable during the mid-wet to early dry season if there is equilibrium among the three factors (ecological, territorial and political environments) in the area in which they reside. Therefore, the *seeto luginni* (mid-wet) *ndungu* (wet proper), and *yamde* (yamde (early dry) seasons make veterinary delivery services easier from a cost-benefit logistic point of view. By the same token, the other remaining eco-periods demand a more careful and rigorous logistic approach from the view of the general nomadic behaviour. This is the period in which the veterinary extension service needs to do a lot of homework and re-thinking in their approach. In fact, the apparent losses in cattle by the Fulani call for caution and perseverance, otherwise the services the extension render may have easily created between the innovators (the veterinary workers) and the acceptors of innovation (the pastoral population). It is not secret that the pastoral Fulani are noted in their refusal to receive veterinary services because of the apparent fear of cattle loss. It is needless to repeat here the Fulani experience with one of the veterinary pro-

grammes coded JP 28.

Without underrating the tremendous tasks facing the extension workers in their disease control efforts and other non-specific disease problems, particularly that of malnutrition, I think there is still need for improvements in the ways veterinary services are extended to our pastoral population. For this reason specific recommendations may be considered.

#### CONCLUSION & RECOMMENDATIONS:

I have hinted above to the effect that the success of veterinary services is bound to depend to a large extent upon the complete recognition of (a) the symbiotic relationship between the conditions of the Fulani system of cattle keeping in its traditional settings, on the one hand, and the effective implementation of the various existing veterinary programs, on the other; and (b) the Fulani pastoral skills. Since the two complement one another, in my mind, they should be married, if only for the purpose of the obvious influence they will exert upon the planning and execution of the veterinary services.

On the basis of these factors I suggest that consideration be given to the applicability of the following measure:

- (1) To achieve greater efficiency there is a need to intensify mass campaigns to inform the consumers of the services on the short and long term goals of animals health care.
- (2) Mobile veterinary services, mobile clinic and barefoot veterinary doctors should be set up in areas where the Fulani carry out the dry and wet seasons grazing activities, rather than encouraging them to come to the services as is the case now. However, to do this there is need to chart the movements and positions of the nomadic groups at any given time. Here field experiences will be

an asset.

- (3) Basic veterinary training should be made more productive and service-oriented so that veterinary students could start to contribute to health care delivery during the course of their training. Besides extending their clinical experience to the Fulani, the thrust of their efforts should be directed to teaching rudimentary environmental and personal sanitary practices, specifically stressing the importance of protecting dairy products from flies which are numerous in their camps. Their activities will go a long way to complement the routine health care services being provided by both the veterinary superintendents, and veterinary assistants.
- (4) Attempts should be made to create intermediate veterinary personnel with the objective of bridging the existing manpower shortage of veterinarians in the country. The existing ratio of one veterinary doctor to twenty-two thousand head of cattle is not encouraging if not embarrassing.
- (5) To ensure that pastoral people receive the fruits of the progress being made in the field of curative veterinary medicine all over the country, efforts should be made for immediate transfer of the progress to our wanting nomadic population.
- (6) The existing tsetse fly eradication projects in areas where they still constitute a menace should be intensified.
- 7) High-protein supplementary feed to improve nutrition, which will allow lower mortality, increase fertility and growth should be provided.
- 8) The need for interdisciplinary cooperation among experts in the field of livestock production should be encouraged.

Finally, all the efforts of our

veterinarians and animal scientists must now be directed towards the development of improved methods of animal production to replace the existing practices of our untie pastoral population. Also by the same token the art of livestock and management skills of our pastoral communities, which have undergone trials and errors over several decades of ecological adaptations, in West Africa savanna belt should occupy a recognized position in the scientific pursuits of the veterinarians.

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