Dry Season Fulani Trashumance and Cattle Trypanosomiasis: The Nature of the Relationship

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INTRODUCTION

POPULATION mobility has long been established as a feature of life in Africa and even today it is one of its most important demographic features. There are few contemporary problems in the fields of administration, disease control, and of economic and social developments in Africa which cannot be related to this factor.

A good deal has been written on trypanosomiasis and the tse-tse-fly. By contrast, comparatively few works cover the epidemiological significance of Fulani dry season transhumance in relation to trypanosomiasis. Richard Turnbull (1961) in an opening address of a symposium on the 'Conservation of Nature and Natural Resources in Africa' said that: "Man is the most dynamic biological factor which has ever disturbed the balance of nature on earth, for he has ceased to be an integral part of the environment and has become a controlling factor, disturbing by one means or another the natural balance of other living things".

Historical Background

Brandt in 1919, reported that there was a great risk of annual movement of Fulani herds from south to north "introducing infected animals from tse-tse-fly infested

localities into clean herds". This prediction was confirmed in 1920 when 67 outbreaks of trypanosomiasis were reported in Zambezi province as opposed to 6 in the previous year; 82 outbreaks were reported from districts of southern Kano alone in the last 8 months of that year. Most of the affected herds had returned from their dry season grazing grounds in southern Zambezi and Nasarawa provinces, where they probably contracted the disease. By 1921 it was clearly established that trypanosomiasis was being carried northwards owing to the increasing facilities for movement of the Fulani herds from North to South (Glover, 1961).

The World Health Organization/FAO and Agricultural Organization Expert Committee on Trypanosomiasis reviewed in 1962 and 1969 the factors which have been responsible for the failure of programmes designed to eradicate trypanosomiasis. The lack of appreciation for the importance of human habits, political and socio-economic conditions were listed. Dry season transhumance and cattle migration were discussed as factors that were definitely responsible for introducing and reintroducing the parasite into new areas in the course of their wanderings and influence the epidemiological situation. Jiya (1971) noted in the quarterly pro-

report of the Northwest State Veterinary Division that "disease situation is becoming more difficult to control due to uncontrolled movement of cattle.

Ecology of Dry Season Transhumance

The Nomadic Fulani, concentrated mostly in the northern States of Nigeria, are the principal cattle owning people of Nigeria. While the force of tradition tends to maintain this nomadic life, it is also sustained by other factors. Conditions of land tenure exist in which many Fulani cattle owners have no title to the land over which their herds graze. They lack the funds and the technical know-how necessary for the establishment and maintenance of settled husbandry. Their environment is often severe, and they find themselves in a situation of seasonal shortages of water and pasture and severe, endemic diseases like trypanosomiasis, contagious bovine pleuropneumonia, streptothricosis, and those that are tick-borne.

Cattle cannot be thought of as milk or meat producers only. They have to be capable of long treks to, from, and between pastures. Not only must Fulani cattle be able to undergo seasonal irregularities in calving: most Fulani cows will not calf during the dry season (Lamorde, 1973) but also in both the amount and type of fodder and water available. Nomadic herds are commonly exposed to trypanosome infection by having to pass through or close by tsetse-infested bush while migrating (Fig. 1).

Dry Season Transhumance and Tsetse-fly Population

Dr. T. A. M. Nash, an entomologist with Sleeping Sickness Service of Nigeria, carried out a general survey of eastern districts of Zaria emirate where sleeping sickness was causing serious harm to the population. The trypanosome infection

rate was as high as 29 to 40% in 1937. It was suggested that an attempt should be made to form a fly-free corridor 60 to 70 miles long by 10 miles as a control measure, and at the same time provide a fly-free trade and cattle route. Some 70,000 people would be involved and most of them would need to be moved into the corridor. Work was begun in Anchau district in October 1937 and part of the task was to exterminate 2 riverine flies, *Glossina tachinoides* and *G. palpalis* from some 700 square miles of country; the savanna or cattle-fly *G. morsitans* did not exist there then. By 1949 human sleeping sickness and tsetse-fly were eradicated from the corridor. When the eastward and northward movement of *G. morsitans* was detected in 1951 in Pambeguwa area, west of Anchau, it was hoped that the Anchau corridor would act as a barrier to this fly advance. The corridor was supported by further barrier clearing. As an anti-sleeping sickness measure and settlement scheme, the Anchau corridor has been a great success as it has remained free of riverine fly ever since control of the corridor was relinquished to the Local Authority in 1949. But *G. morsitans* front now lies well to the north east of Anchau. Thus, far from acting as a "fly-free trade and cattle route", the Anchau corridor really became a channel for transporting *G. morsitans* to the fly-free country beyond.

The Shika Stock Farm, which lies about 14 miles to the north-west of Zaria in the Northern Guinea Savannah Zone within *G. morsitans* belt, was started in 1927. The first serious outbreak of bovine trypanosomiasis was reported in 1944 (Kirby, 1963). In October, 1948, blood slides revealed an infection rate of 16% among the cattle and by 1956 the infection rate had risen to 19%. *T. brucei* was diagnosed once in 1948, but since then the

FIG. 1. NORTHERN STATES OF NIGERIA—DRY SEASON FULANI TRANSHUMANCE

trypanosomes involved have been *T. vivax* and *T. congolense*. *G. tachinoides* was first recorded on the Shika river to the north of the farm in 1929. In 1946 it was found on the farm but eradicated in 1950 by clearing the riverine vegetation. *G. morsitans* was first recorded in a nearby forest reserve in 1953 but became established on the farm by 1954.

The Veterinary Tsetse and Trypanosomiasis Unit became interested in the Shika tsetse problem in April 1954. The bush on the farm was cleared, but it was not until 1958 when all possible cover was removed that it was thought that *G. morsitans* had ceased to breed on the farm. Flies caught subsequently were brought on to the farm from the nearby forest reserve foci by animals, people and vehicles.

An investigation into the value of insecticide in the control of *G. morsitans* was started at Shika in 1959. The main areas in the vicinity of the farm in which *G. morsitans* were established were two forest reserves immediately to the south-west of the farm. The combined extent of the two reserves was about 17 square miles and the total area in which the spraying was carried out, was estimated to be 37 square miles. The area was sprayed with a single application of D.D.T. — water suspensions. During the month of January, before spraying started, the mean catch of *G. morsitans* per patrol mile of a fly round was 4.7, but after spraying had begun, catches declined rapidly and within 3 days of treatment, it was exceptional to find an adult fly in any sprayed area. Later fly round figures for the wet season of 1960, indicated that the fly population was remaining constant at a low level of 0.02 *G. morsitans* per patrol mile. A dramatic increase in fly numbers occurred in November, 1961

reaching a level higher than before spraying started in 1959. The chief source of reinvasion by the fly was from the forest reserves closely following Fulani cattle migration routes. By 1963-64 a total area of 500 square miles had been sprayed, but there was still reinvasion brought in by Fulani herds grazing and camping in the tsetse-free prohibited area. Even in 1967, when some of the Fulani were persuaded to move away with the help of local Authority police, their place was quickly taken by others coming along the same cattle route.

There has been no trypanosomiasis in the Shika herd from 1964 until 1971, but the quarterly-reports and survey maps show that tsetse-fly reinvasion into the scheme area occurs every year along the same cattle tracks, roads and footpaths in both the Kakangi and Fatika areas. In 1971, 5 per cent of the Shika herd became infected with trypanosomiasis and 2 deaths and 4 abortions were reported due to the infection (Leeftang, 1975).

The report of a survey on "Tsetse Control and Land Use in Northern Nigeria" was published in 1967 by Glover and Aitchison. In this survey some attention was given to the implications and effects of Fulani movements on the dispersal, spread and build up of *G. morsitans* into fly-free country. A fly-round survey ran for 6 miles along a major cattle track northwards from Mallamawa stopping at the Kano-Katsina river confluence (Aitchison, 1959a). No flies were found in June 1954 on this round. In December 1954 a few *G. morsitans* were caught representing less than 0.5 flies per patrol mile. By December 1956 the density had increased to 6 flies per patrol mile; at the beginning of the dry season in November 1957, the density had reached 18 flies per Patrol mile. At the time of the annual northward cattle migration from the dry

season grazing grounds, which are more heavily fly-infested, the density jumped from 26 flies per patrol mile in June 1958 to 71 flies the following month.

The Rirawai-Ningi-Jira areas were pilot projects designed for the eradication of *G. morsitans* with insecticides from the Northern Guinea Savannah Zone. Aithchison (1959b) in his end of year quarterly report, demonstrated the effect of migrating cattle on the density of *G. morsitans* in Rirawai area of Bauchi province. On the 4th of November 1959, a fly round recorded a catch of 36 flies per patrol mile. A catch of 107 flies per patrol mile was made on the 12th of November, 6 days after a herd of cattle passed along the track. Tarry (1961) made a similar observation in the Ningi-Jira areas.

The economic importance of trypanosomiasis and its close relationship with trade cattle on the hoof was investigated by Na'Isa (1967). Twenty young bulls, 2½ years old, were trekked for 37 days along a trade cattle route from Jibiya on the Niger border to Ilorin, a distance of 445 miles. The animals were divided into 4 groups of 5 each. The first group was the untreated control. The other 3 groups were treated intramuscularly with isometamidium (Samorin) at the rate of 0.25, 0.5 and 0.75mg/kg of body weight respectively, before the start of the journey

Among the controls, one animal died of babesiasis on the journey and the other 4 of trypanosomiasis at Ilorin. One animal was infected with *T. vivax*; the second had a mixed *T. vivax*, *T. congolense* and *Babesia* infection. The third animal started with a mixed *T. congolense* — *T. brucei* infection later changing to *T. congolense* — *T. vivax* with *Microfilaria* in some of the blood smears. The fourth bull began with a *T. congolense* changing to *T. vivax* and then becoming a mixed infection.

Four of the 5 animals in group II treated with isometamidium at 0.25 mg/kg also died of trypanosomiasis at Ilorin. This experiment did give some idea of the magnitude of annual losses to the trade cattle industry moving on the hoof. Trade cattle on the hoof tend to remain highly infected with trypanosomes and they also constitute a menace as a reservoir and disseminator of new infections to those areas that might otherwise have remained free of trypanosomiasis.

Effects of Established Government on Dry Season Fulani Transhumance

Various suggestions have been offered and attempts have been made to alter the way of life of the nomadic Fulani. Cattle migration and trade cattle routes are marked out. Control posts have been built along trade cattle routes mainly to offer veterinary services and to provide watering and grazing facilities to reduce weight losses and facilitate easy railing and trucking.

An attempt is now being made to demarcate grazing lands. The Ruma — Kukar-Jangar project, along the borders of Sokoto and Katsina provinces is a typical example. In this project area, water reserves and artesian wells are being developed to extend grazing periods well into the dry season. Unfortunately, there are still insufficient grazing areas with satisfactory watering facilities in the tsetse free "far north" so that livestock must be moved southwards in the dry season through tsetse-infested areas to watered areas.

A start was made in 1963-64 with the distribution of supplementary concentrate feeding in the dry season. A mixture of equal parts of groundnut cake and cottonseed has been used and volunteer stock have responded well. After three years of demonstration on volunteer cattle,

the results proved so satisfactory that the demand for assistance in this regard is increasing particularly in the Benue-Plateau State where the practice is being kept up. During the launching of the Third National Development Plan (1975-1980) the 'Jangali' or cattle tax was abolished and this was hailed as another mile-stone in the Fulani amenities programme.

The eradication of tsetse from certain areas by the Tsetse and Trypanosomiasis Division and the use of both curative and prophylactic drugs have tended to encourage dry season transhumance for the Fulani now feel safe to take their herds into reclaimed and infested bush.

Proposals and Prospects

There is no doubt that elimination of tsetse fly, which has long placed strict limits on the utilization of a large part of Nigeria, is now technically feasible. A great deal of knowledge has been gathered in the past 15 years by the Tsetse and Trypanosomiasis Division about methods of eradicating tsetse flies in the different vegetation zones of the north. In fact, modern insecticides now provide a means of eradication on an unprecedented scale.

The main problems at present are: (i) to protect those areas which have been reclaimed from re-invasion by the fly; (ii) the lack of effective land use in the areas thus made available in terms of combined arable farming and animal husbandry. At a conference on the fauna of East and Central Africa held in Nairobi in 1947, it was emphasized that the eradication of tsetse flies was of little value unless full use was made of the land reclaimed, and plans for efficient land use should be worked out before measures for eradicating the tsetse fly were undertaken.

Where movements of population cross not one but several international boundaries, there are three possible ways of dealing with the problems which they create for disease eradication. The first would be for these boundaries to be effectively sealed, or movements across them strictly controlled. There has been no evidence to show that this is possible in Nigeria or any part of Africa. If boundary control is impossible, or is likely to become effective only with military operation, an alternative way of dealing with inter-territorial movements will be to establish simultaneous inter-territorial eradication projects. For economic reasons and within the context of present political instability and upsurge of military coup d'état in Africa, this alternative is not practicable yet. In Nigeria, one obvious solution to tsetse fly re-invasion of cleared areas is to develop and enforce settlement of the nomadic Fulani on co-operative mixed farms. In terms of benefits to the Nigerian economy, the cattle Fulani and Nigerian society, as a whole, control of tsetse fly with adequate use of cleared areas constitute one of the most productive measures that the country can take.

Forced Settlement

The administrative measure of wholesale movement of human populations from areas where disease is endemic and settling them in a disease free area is an established and successful practice. The use of 'sleeping-sickness settlements' has been the mainstay of control work against Rhodesian sleeping-sickness in Tanzania and Uganda (McKelvey, 1973). An excellent example of this holistic approach in Nigeria is the Anchau development and settlement scheme to which attention has been drawn earlier. Nash (1948) has observed that, in Northern Nigeria *G. morsitans* is usually present in areas where the human population density does

not exceed 40 people per square mile.

With settlement, the present system of mass treatment against trypanosomiasis could be replaced by the more effective individual cure and prophylaxis on regular basis. It would also be possible to isolate infected animals and improve on quarantine methods. Isolation and quarantine constitute the first line of defence against a disease in a herd.

Settled husbandry, as a rule, can cater more effectively to the factors of production. Henry and Licht (1971) and de Leeuw (1974) have adequately espoused the ideas of settling the nomads on mixed farms to increase the productivity of their animals.

Mixed Farming

There is no long established tradition of using animals for draught in Nigeria. Nonetheless, the idea of mixed farming is not alien to Nigeria. The use of cattle as a source of power was first demonstrated in Daura, North Central State, in 1922, the concept being to treat the animal as an integral part of a permanent farming system for meat and manure, rather than a mere labour-saving device. An extension programme was launched in 1933 by the then Northern Nigeria Ministry of Natural Resources to encourage mixed farming. During the 1962-68 development plan period, over ₦640,000 was allocated under the 'Mixed Farming Loan Project (E-13)' to allow local Authorities to make advances to established mixed farmers. The aim was that with the serious problem of increasing pressure on land, rotation of grazing reserves could be replaced by rotation of crops and planted grass. Enough fertility could be put back into the soil through addition of animal manure to permit continuous use. The experience of the Soviet Union in settling her nomadic population and that of Tanzania in the

efforts being made to establish co-operative farms point to the consolidation of a fluid society into a more stable state.

Fulani Co-operation

A co-operative is not collective farming, but a way of organizing individuals in order to facilitate the supply of their requirements and the marketing of their products. Co-operative mixed farms will not disturb the family basis of production. The nomads, whose introjected norms concern co-operation within a broad circle of agnate lineage groups, have developed attitudes necessary for the efficient operation of co-operative mixed farms. It is an effective way by which the cattle Fulani can improve their husbandry practices, and overcome the difficulties associated with lack of capital and technical know-how which they purport not to possess for establish mixed farms.

The late Sir Ahmadu Bello, the then Minister for Local Government and Community Development wrote in the foreword to the first Annual Report on the Progress of Co-operative in Northern Nigeria for the year 1951-52 that "co-operation has an important part to in the economy of this Region and can do much to raise the standard of living of the people. It is a form of community development... and as such, can with it not only financial gain but also bring moral benefits." In nearly every democratic society some phase of co-operative actions has been made a sanctuary in times of economic distress.

This phenomenon is illustrated by the upsurge of the co-operative credit movement in Germany, 1843-1910; Denmark 1851-1920; and Finland 1902-1930; by the consumer co-operative movement in England from 1830-1930 and the successive waves of producers' associations which appeared on the scene from 1870-1930 in the United States. The practical features and

merits of co-operatives contributing to economic progress are generally recognized now as indispensable institution in a dynamic economy.

CONCLUSION

Fulani mobility, in all its various forms, can menace public health and jeopardize the vital economy of the livestock industry, both by assisting in the maintenance and spread of trypanosomiasis, and by thwarting measures to eradicate it. Ecologically dry season transhumance is geared to the changing seasons and the varying amounts of water and pasture available. A satisfactory pastoral development should be directed towards the amelioration of the harsh conditions of the habitat which is the background of their mobility. This can be achieved through the integration of animals and crops on cooperative mixed farms leading to effective land use, enhanced soil fertility and increased animal productivity.

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