



PROBLEMS OF LIVESTOCK IMPROVEMENT IN WEST AFRICA

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### The Importance of Ruminants

Livestock improvement in a very broad sense denotes the whole range of effort directed at raising the level of productivity of animals used by man as food. In this connection, the term embraces the feeding, breeding and care of animals - in health and disease - for the most rapid and optimal returns in meat, milk and egg products.

In this discussion, I propose to deal with the ruminants i.e. cattle, sheep and goats. I have chosen the ruminants because they are the most problematic in the local improvement effort. They are bigger animals, and not so easy to handle. Besides they eat more food and require more individual attention. And unlike pigs and poultry in which the need for improvement has more or less been successfully circumvented by the importation of well-adapted breeds, the ruminants in our environment are to a great extent, still unspecialized for the levels of productivity expected of them.

Another reason why I have selected the ruminants for discussion is that theoretically they are cheaper to raise. Cattle, for example, eat grass - which from a human point of view, is an undistinguished source of food, but which the ruminant is capable of upgrading into highly nutritious and prestigious products such as meat and milk. What is more, grass costs nothing, and ruminants do not have to compete with man for it.

This situation contrasts sharply with that of non-ruminants (pigs and poultry) which require highly specialized, invariably purchased feeds such as cereal and cereal by-products. Furthermore, since man also requires grain foods to sustain himself, the question ultimately posed is what is more economic to do: eat the grain directly as food, or harvest it as meat from livestock. Of course, this is not to oversimplify the issue. Meat from non-ruminant sources may be regarded also as an upgraded form of grain, with better nutrient quality than the original plant material.

Perhaps the most important advantage in raising ruminants is the relatively high acceptability of their meat in this part of Africa. Unlike pork, for instance which suffers prejudice of various sorts (religious, traditional, quality etc.) and poultry which is strictly a sacrificial and festivity animal reserved for special occasions,<sup>1/</sup> beef, mutton and goat meat find ready acceptance and market in various forms - fresh, preserved and processed at all times. Local obsession with beef for instance, led recently to the establishment of beef canneries in Nigeria and Ghana, of which the latter has since gone out of commission because of the high cost of imported cattle.

Of all the ruminants, the smaller species, sheep and goats (and goats, more so) probably have better prospects of improvement than cattle. These animals are litter-bearing, at best, cropping twice in 18 months (sheep) or three times in 24 months (goats) - yielding in the process up to a maximum of three offspring which are themselves capable of reaching market weight quite early, or about three times earlier than cattle under local husbandry conditions.

#### Problems in Ruminant Production

Environmental factors, acting through climate probably exert the most depressing effect on livestock production in West Africa. The effect is most noticeable south of latitude  $14^{\circ}\text{N}$ , a sub-region embracing the Gambia, parts of the Senegal, the Guineas, Sierra Leone, Liberia, Ivory Coast, Ghana, Togo, Dahomey and the southern part of Nigeria. In this belt, high temperatures and humidities lend support to growth and activity of pests (notably the tsetse fly) - to the detriment of animal health and productivity. This is usually aggravated by a lack of interest in animal husbandry and by a tendency to value animals more for their social than their commercial worth.

As one moves north, beyond latitude  $17^{\circ}\text{N}$ , the limitations to animal husbandry are poor rainfall and poor vegetation - the environment being

<sup>1/</sup> e.g. Christmas, New Year, Easter, births, christenings, etc.

of the scrub-desert type. In between the two latitudes, a region including Mauritania, Mali, Upper Volta, Niger, parts of Chad and northern Nigeria, geographical and health conditions begin to take a milder outlook. At the same time human (occupational) interests tend to blend successfully with animal husbandry, consequently productivity reaches a fairly high level, providing surplus meat which finds ready market in the 'livestock poor belt' to the south.

#### Dry-season Problems: Nutritional Conditions

Perhaps the most important feature about the climate of West Africa is its effect on the vegetation (grasses) and on the feeding and nutritional status of ruminants.

Depending on the area, grasses may become available for only a part of the year. In certain areas such as the Ghanaian coastal savannahs grasses are available twice a year, at the time of the rains which reach their maxima in May or June, in the first season, and September or October in the second. Thus in the intervening periods, July to August and December to March, droughts set in, accompanied by high temperatures. In other areas such as the northern savannahs which have only one rainfall season - reaching its peak in June and declining in October, the drought is severer, lasting sometimes as long as eight months (November to May).

During the rainy season, the grasses mature very quickly - their protein content rapidly decreasing, while then fiber content attains levels theoretically unsuitable for young and growing ruminants such as calves. As the dry season sets in, both plant and animal life enter their most trying state. The growth of vegetation is gradually arrested, eventually becoming devoid also of important minerals such as phosphorus and nitrogen.<sup>1/</sup> In time, the grasses assume a straw-like character, entirely losing their lush and feed value. As a consequence ruminants suffer severe weight loss, which over a number of years manifestly prolongs their maturation.

Along with the problem of feeding (in the dry season) is the requirement for water.

<sup>1/</sup> This mineral deficiency is due largely to inherent deficiencies in the soil. (Another important nutritional lack in the dry season is Vitamin A.)

The total annual rainfall in most areas of West Africa - south of latitude 17°N is considered adequate for the needs of livestock. However, there is always a problem with water because of the seasonality of the rains, their variability (in character and intensity) and most important, in heavy runoffs especially in areas of tight soils.

#### Alleviating Dry-season Problems

Throughout time, governments as well as individual farmers have sought numerous means to alleviate or arrest these contingencies. Much of this effort has been directed at conserving rain water. This has been done largely through the construction of dams and ponds while in other cases, runoffs have been held at bay through land-contouring and terracing.

For feeds, solutions have been sought through supplementary feeding with hays and silages, though traditionally, the practice has been to burn bush or clear land in order to obtain fresh growth of pasture. More significantly in recent times, however, is that ruminant enterprises are now moving to areas with reasonably good distribution of rainfall and year-round grazing facilities. In Ghana, the best known of these areas is the Tongu District in the Volta Region where successes have been recorded on the general performance of cattle on paddocked management. There have also been suggestions of pasture cultivation, the use of chemical feed sources (e.g. urea) and the siting of livestock operations in rice growing areas to take advantage of the available water and rice straw.

#### Problems of Animal Health

We have seen that adequate feed, water and sound nutrition are important if livestock are to maintain a reasonably high level of productivity. Lack of these may lead, in addition to lowered performance, reduced vigour, weight losses and ultimately death.

Next to nutritional problems, the most important factor limiting production is disease.

The environment supports disease-producing pests of all kinds - viruses, rickettsiae, PPL0, bacteria, fungi, protozoa, helminths - including their vectors and intermediate hosts (flies, ticks, mites, lice, etc.) as well as their reservoirs (game animals).

Depending upon the kind of adaptation, an infectious disease may manifest itself in many ways. Certain diseases have a more or less permanent presence in the environment, i.e. they are endemic and operate through carriers of various sorts. An example is the protozoal disease trypanosomiasis (or sleeping sickness) which is carried by the tsetse fly, and perennially responsible for losses among cattle throughout the 'livestock poor belt'. Others though not endemic, are of sporadic nature and when they strike, are capable of spreading far and wide with extreme rapidity. An example of this is the virus-caused foot and mouth disease (or FMD).

A third major class of diseases are the zoonoses. These are strictly infections of animals which are capable of being transmitted to man through contact or by the consumption of an infected meat. The diseases here include FMD, bovine tuberculosis, anthrax and brucellosis.

In the small ruminants, diseases of helminth causes are of greater economic importance. Though basically attributed to the environment, human factors such as management also play a role. Helminth diseases include roundworm (Ascarid), wireworm (Haemonchus), tapeworm (Taenia), strongyles and fluke infestations. Most worms are transmitted through the soil, grass or faeces, usually under intensive management.

#### Control of Livestock Diseases

The effect of disease on livestock is variable, ranging from ~~anything from~~ lowered productivity to outright death. During illness, productivity suffers through loss of appetite, i.e. decline in the frequency and intake of feed, curtailment of rest periods etc. Control of animal diseases thus calls for both direct and indirect approach to the elimination of pests. The indirect approach is usually effected through improved management, nutrition and such measures as would enhance productivity and lessen the proneness to infection.

The direct approach includes, in part, reduction in the numbers of pests, and in part, in the protection of the animal from attack. The measures applied here include prophylactic vaccinations, animal dipping and spraying (with pesticides), as well as of course, medication during infection. In certain cases such as anthrax and contagious bovine pleuro-pneumonia (CBPP) slaughter policies prove more effective.

The use of legislative procedures for the restriction of animal movement including quarantine and the development of stock or marketing routes also provide immeasurable degrees of control. There is also the traditional burning or clearing of bush in areas of livestock operations for purposes of destroying the breeding grounds of pests.

#### Breeding and Genetic Improvement

Ordinary animal breeding has also been used to some extent in the fight against diseases. In essence the aim had been to develop animal types resistant to specific infections, while at the same time maintaining their productivity. Examples are the Sangas or crosses of the humped (Zebu) cattle and the unhumped (Shorthorn) breeds. In these crosses, the progeny usually retains the Shorthorn inherent resistance to trypanosomiasis, but takes after the Zebu in size and yield of meat. This is because desirable genes tend to concentrate in the progeny with successive breeding. This practice was being carried out locally, long before scientific breeding was introduced into West Africa.

By and large, progress in the scientific improvement of ruminants through breeding - either by the upgrading of the native stock to higher yielding types or by the subsequent development of newer better-yielding lines from the up-graded animals, has been extremely slow. This has been due to several factors among which are the following :

1. Lack of accurate technical data on the reproductive and genetic characteristics of the various breeds: e.g. heritability of traits, reproductive efficiencies;
2. The rather long generation interval characteristic of these animals.

A generation interval is the time lapse between two successive births. For cattle this is about 2 years during which only one calf is produced. So, for the total useful life of the cow which in Ghana is estimated at about 11 years, one can only expect as few as five calves in all. By comparison, the Large White pig is capable of farrowing up to 30 piglets in a year, half of which theoretically can give rise to a total of 450 piglets within another year. Improvement in pigs, is not the point here, but it serves to illustrate the fact that progress can come about more rapidly where the generation interval is shorter, the reproduction rate higher, and the frequency of littering greater, as these would make possible a more effective and intensive selection for the types of stock desired as well as their quick and positive propagation.

### What to do with Available Opportunities

While solutions to these problems are being sought through accelerated research, there is, at the same time, a dire need to increase markedly the number of meat animals intended for consumption. And here, it appears at the present time, simple crossing-breeding of high-yielding or tropically well adapted (exotic) stock with the locals - to the first generation stage will suffice, provided this is coupled with improved management, particularly of younger animals - calves, lambs and kids. For it has clearly been shown in several studies locally, that when Jerseys for instance, are mated to local cattle (Shorthorn, Ndama or Zebu), the F<sub>1</sub> crosses produced are capable of reaching a weight of 900 lb. in two years for animals intended for use as meat, compared with about 200 lb. for the same time when the locals alone are inbred. For dairy cattle of similar exotic-local parentage, levels of milk yield as high as 4,000 lb. per year have been attained - which is only a little under the value of 4,500 lb. on record for purebred Jerseys in the Western Hemisphere.

Biologically, the main advantage in simple cross-breeding lies in the fact that it provides the breeder with a means of concentrating the vitality, prolificness, rate of gain and livability in an offspring to a degree greater than that of either parent alone. These traits, collectively referred to as hybrid vigour have one main disadvantage though; they exist in the first generation only. A programme of cross-breeding such as envisaged above, therefore, would theoretically depend for success upon the use of 'pure' parental stock at every cross. Luckily, however, the need for a servicing male, can be circumvented by the use of stored semen in an artificial insemination programme. This, in addition to guaranteeing a constant and dependable source of exotic blood, would also assure that as many female animals as possible are inseminated in every crossing exercise than would otherwise happen under natural conditions. This assured, the remaining problems would strictly be those of management.

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