

Need for a Range Management Approach for Nigerian Grasslands¹

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Highlight

Development of extensive Nigerian grasslands should follow a range management philosophy. A range management approach offers the best solution for utilization of resources already at hand without the initial need for planting improved forage varieties, fertilization, complicated management schemes, etc. Research information is needed relative to utilizing existing grasslands that can also serve as a base for later development.

Nigeria is a relatively new African nation with great agricultural potential. Increased agricultural productivity will be required to support a burgeoning

population of over 50 million. One area of agriculture that has received little professional attention in the past and should be emphasized in the future, is range or grassland management. Because of the great differences among the main vegetation types the same problems are not to be found in each region and consequently different research and management programs are required. However, the same general principles apply and point to the need for a range management approach in solving the grasslands problems of Nigeria.

Grassland Vegetation

From the Atlantic coast inland to the north there is a general decline in rainfall from 140 inches to 20 inches at the border of Niger Republic (Buchanan and Pugh, 1955). Rainfall occurs every month near the Atlantic coast and diminishes to a 2-season pattern inland with an extreme of 5-months drought in the northern one-third of the country.

Vegetation types (Ratray, 1960) change with decreasing precipitation, going from mangrove swamps near the coast to tropical forest farther inland and out of the flooded river bottoms. A "derived savannah" type has been developed on the interior margin of the tropical forest by intensive tree cutting and brush clearing. Farther inland the

Southern Guinea Grassland zone exists in a 45-60-inch rainfall area. This mixed savannah of *Andropogon gayanus*, *Pennisetum purpureum*, *Panicum maximum* and other species blends into a more open savannah of shorter grasses and woodland in the Northern Guinea Grassland zone. Here the 45-inch annual rainfall occurs from April to October. Farther inland the grasses become shorter and thorny shrubs and annual species are in great abundance in the Sudan zone of 25-35-inches rainfall. The vegetation of this zone has been modified almost completely by burning and grazing of domestic livestock over many years so that the present cover bears little resemblance to the true climax (Rains, 1963). The extended dry period of up to 5 months is one of the most important factors controlling the vegetation of the Sudan zone.

Nigeria is divided into three main geographic areas by the Niger and Benue rivers and their broad river basins. Vital bridges connect the regions and funnel the agricultural commerce along a few main routes. Such routes offer convenient points for veterinary inspections and livestock census taking but restrict the flow of livestock to market.

The Livestock Industry

Production of livestock is inadequate to meet the nutritional

¹Observations for this paper were made while the senior author was in Nigeria on a Rockefeller Foundation educational travel grant. Grateful acknowledgment is made to personnel of the Ministries of Agriculture in Eastern and Western Nigeria and to the Ministry of Animal and Forest Resources, Northern Nigeria. Paper presented at Nineteenth Annual Meeting, American Society of Range Management, New Orleans, Louisiana, February 2, 1966.

needs of the population. Quality is low and several years are required to produce an animal for market. Over 26 times more cattle are produced in the north than in the south. Several reasons may explain the greater animal population in the north: 1). There are extensive grassland areas in the north not dominated by forest. 2). The north has relatively greater freedom from tsetse fly (*Glossina* spp.) problems during part or all the year (Davies, 1962). 3). Livestock herding is part of the social tradition for such tribes as the Fulani and Tiv.

The predominant animal breeds in the north are Zebu types; the White Fulani and Red Bororo. These cattle are not resistant to trypanosomiasis (sleeping sickness). Nearer to the middle belt is found the Keteku and N'Dama which are considered to be naturally resistant to trypanosomiasis and, although smaller than the White Fulani and Red Bororo, possess numerous favorable beef characteristics. In the derived savannah and tropical forest the Muturu is the adapted livestock type. It has a high degree of acquired tolerance to trypanosomiasis but is a small animal (300-450 lb) and is slow to mature.

Some effort is presently being directed to breed improvement by the introduction of European and American bloodlines. But considerably more emphasis needs to be given to developing crosses and strains that mature fast, are resistant to sleeping sickness, have a good size, and show an efficient rate of gain.

A common practice is to select the large, older animals in the herd for market. By the time an animal is thus selected it may be from 6 to 8 years old and has gone through several seasons of gain on green forage and almost as much loss of weight on dry forage. After several years of incremental gains an animal is

sent to market at a weight of from 600 to 800 lb. It is clear that greater livestock production could be obtained if animals were not allowed to regress in weight each dry season. Better management of existing forage sources or development of supplemental feeds for use in dry seasons would permit continuous gain and earlier marketability.

Along with improved livestock breeds must also come a better system of livestock marketing. Instead of a large number of animals being trailed to a market where quality receives no consideration and animals are slaughtered for immediate consumption, a transporting, packing, storage, and retail marketing system must be developed to accommodate the improved livestock produced by more modern methods.

Range Management Approach Needed

A large proportion of Nigerian grasslands may be considered in the accepted definition (Range Term Glossary Committee, 1964) of range; i.e., land producing native forage for animal consumption or lands that are naturally or artificially revegetated and managed like native vegetation. A range management approach to the utilization of the Nigerian grasslands would require that the plans and directions for range use seek to obtain maximum animal production consistent with perpetuation of the natural resources.

An example of an extensive grassland area that is managed according to range management principles is the prairie of the USA. Here the extensive grassland areas have been studied from various aspects and the necessary management procedures established for sustained plant and animal productivity.

In what way does a range management approach differ from others such as a botanic or

agronomic approach that might be utilized? The main difference lies more in the beginning than what happens later. Range management emphasizes management and improvement of the extensive forage resources which are already at hand. After simple and productive management programs have been developed, it follows then that other practices may be initiated which are common to the general field of range and pasture improvement. The experiences gained in the management of present grasslands would be vital to the success of programs for intensive pasture development in suitable areas. The revenues thus obtained would also provide a broader base for necessary capital improvements.

In Nigeria over 140 million acres of grassland already exist and only require the application of range management principles to provide greater carrying capacity and more efficient livestock production. These lands cannot be ignored while small areas come under intensive management. An exception to this, of course, is the derived savannah zone where replacement of trees with grass has already been on an intensive basis over a period of many years.

How might the range management approach be applied to the development of Nigerian grasslands or other grasslands of the world where increased productivity is necessary? Several steps are available in this evaluation. First of all, there should be an improvement in the understanding of the present use and land tenure patterns, including knowledge of the response of the forage species to management and other conditions of use imposed by the livestock grazer.

Second, reliable information should be developed concerning the nutritional value of the principal forage species, estimates of present and potential water

available for livestock use, an evaluation of the seasonality of forage production and the alternatives available for livestock feeding during the periods of low forage quality and production.

A third step is to determine the opportunities for range improvement and more efficient livestock use, starting with the present forage resources.

Grassland problems are being studied at research stations in various parts of the country. Also, each state university and the University of Ibadan have grassland research programs. Contributions to grassland knowledge are also being made by the farm settlement schemes and commercial livestock ranches. Some of the typical problems being investigated include species introduction and evaluation, pasture species mixtures, cutting height and frequency, ley farming (using grass in the crop rotation scheme) and some work on preservation of plant materials for silage. Much of the research effort appears to be directed toward solving problems of improved, intensively-managed pastures. Such emphasis in the derived savannah zone is appropriate but in the Guinea Grassland zones and the Sudan zone the large expanses of grassland require a much different approach. Utilization and development of these large interior grassland areas should follow a range management philosophy.

Reaction of grassland vegetation to use should receive considerable attention. In range management terminology "range condition and trend" studies (Stoddart and Smith, 1955) would help to answer questions as to the effect of current stocking rates, seasons of use, and burning on the stability or deterioration of natural grasslands. The research must be directed along practical lines to provide early solutions to problems. Even though range condition and

trend studies, by their very nature, are long-term, it may be possible to extrapolate from information developed in other rangeland areas by careful and frequent reference to local situations for guidance.

In many of the forest reserves, protection from livestock use and burning has undoubtedly had a significant impact on the pattern of species composition. Where beneficial results have occurred it would be desirable to utilize such results for improving management of livestock on forest reserves and adjacent areas. Cooperation between forestry, livestock, and grasslands research and administrative personnel is essential. Presently, few of the forest reserves are used as grazing reserves.

Too little attention has been given to the effect of burning in Nigerian grassland ecology. More study should be made of the benefits and disadvantages of burning in modifying plant succession and influencing competition between herbaceous and woody plant. In Northern Nigeria burning is a common custom and may have a place in grassland management. However, specific information is lacking (Rains, 1963).

Near villages the common practice of bush fallow needs to be studied in relation to grazing management and cropping. Is bush fallow in the derived savannah as beneficial as believed in the past? Other alternatives may accomplish the same end. As population pressure increases, particularly in the south, greater use is required of the land and it is possible that the bush fallow system may be replaced by a mixed-farming system employing an area of improved grassland to supplement extensive grazing areas during the dry season.

As an aid to management of natural grasslands greater

knowledge of the important native forage species is necessary. Such perennial species as *Andropogon gayanus*, *Pennisetum purpureum*, *Panicum maximum*, *Stylosanthes gracilis* are recognized for their particular forage qualities but more information on their autecology would facilitate grassland management and range improvement. Particularly needed is information about the distribution, variability, ecologic amplitude, seasonal reaction to grazing, palatability and seedling vigor of the important forage species, including annuals in the drier parts of the country. Physiological research could provide a basis for improving grassland management and would provide answers to such questions as seasonal changes in nutritive value, requirements of seed germination, and differences in dormancy of the various species. Control of weedy species such as cogon or speargrass (*Imperata cylindrica*) depends to a large degree on both ecological and physiological information.

A study should be given to methods of obtaining proper livestock distribution consistent with plant and soil productivity under conditions of Nigerian land tenure systems. Local adaptation of such means as salting, spacing of available stock water, herding, and camp systems could provide for better grassland utilization and range improvement.

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