Ranching in East Africa: A Case Study¹

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Highlight

Progressive ranching is contrasted with traditional pastoralism in an effort to show how lagging rangelands might contribute more to economies of emerging countries. This is done by illustrating one rancher's success in overcoming the handicaps that limit tropical livestock production. Grassland potential and problems of rangeland development in East Africa are also considered. Rangeland development in East Africa, consisting of Kenya, Tanzania, and Uganda, is concerned with over one-half million square miles, nearly 20 million people, over 40 million domestic animals, and a rich but uncounted complex of wild animals (Heady, 1964). In Kenya alone four-fifths of the country is rangeland supporting roughly 1¹/₂ million purely pastoral people or about 15 percent of the population.

Despite abundant production, proper management of these semi-arid grasslands is beset by economic, cultural and technical problems that have concealed its greatness (Naveh, 1966). Development is aimed at ways of converting stagnated pastoral subsistence into cash oriented ranching (Larson, 1966). The problem becomes one of up-dating traditional practices within the existing social framework using methods that cause the least possible disruption to present ways of life (UNDP, 1969).

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Producers

In East Africa, livestock are raised by 3 groups of producers: (1) true pastoralist graziers, (2) semipastoralists and (3) commercial ranchers.

To date, true pastoralism is a semi-nomadic existence for several million East Africans. Range and livestock husbandry for the Masai, a large and typical division of pastoralists as described by Maloiy and Heady (1965), has changed little in hundreds of years. Because of the arrested state of development and subsistence economy, this group of producers contributes little to national output. Recent surveys indicate outputs that seldom achieve 10 percent of herd numbers.

Semi-pastoralists are now largely stationary subsistence farmers who supplement their vegetable diet with milk and meat. Normally offtake is consumed, but currently efforts are to organize these small-holders into grazing societies to raise money and contribute livestock for profit-motivated ranching development. Offtake for developing cooperatives usually varies between 10 and 15 percent.

Commercial ranchers became established under colonial governments when European settlers mobilized capital, labor and modern techniques to build very profitable and productive enterprises. Offtake from their herds exceeds 20 percent.

To describe a good commercial ranch operation and contrast its practices with some of the practices of the true pastoralist grazers and semi-pastoralists, the Peckover Ranch is discussed and many of the ideas of the owner, Norman Peckover, are presented.

The Peckover Ranch

The Norman Peckover operation contains nearly 10,500 acres of bushed and wooded grassland that carry 1,500 cattle and about 250 animal unit equivalents of big-game year around. Peckover acquired the ranch from the old John Bull Thompson Estate in 1952. At that time it was mostly an unfenced stretch of bushland with few improvements.

The ranch is in south central Kenya 75 miles north of Mt. Kilimanjaro, 150 miles south of Mt. Kenya, and 200 miles inland from the Indian Ocean. It is the easternmost in a string of European ranches established during the British colonial period as a buffer between traditionally hostile tribes.

South of the ranch on the Emali Plains live the Masai tribesmen and north in the Kilungu Hills are the semi-pastoral Wakamba cultivators. To the east is the 45,000 acre Nguu Cooperative Ranch, a one-time African District Council ranch which is now a Wakamba grazing society.

The Peckover Ranch is approximately 4,000 feet above sea level in a 25 to 30 inch rainfall zone. Ten inches normally fall during March, April and May and about 15 inches in November and December.



FIG. 1. Yearling Boran bulls produced on the Peckover Ranch were recently sold to the Tanzanian and Zambian governments for ranching development.

Temperatures are quite moderate but annual evaporation is over 80 inches from open water.

Soils are mostly the characteristic deep Red Sandy Plateau loams derived from metamorphic Basement System rocks. Part of the ranch is underlain with Pleistocene lava giving rise to volcanic soils. Alluvial depressions in the nearly flat land surface give rise to heavy "Black Cotton" clay soils. Subterranean mound building termites are conspicuous with their unique ventilation tubes spotting the bush covered landscape.

Local plant distribution is largely determined by soil type and internal drainage. Common grasses are creeping or bunch forming species such as *Cenchrus, Chloris, Cynodon, Digitaria, Eragrostis, Panicum, Themeda*, and *Sporobolus*. Weedy shrubs and herbs include *Aspillia, Cassia, Cordia, Grewia, Indigofera, Lantana, Lippia, Sida,* and *Tephrosia.* Bush and scrub trees are innumerable species of *Acacia, Combretum,* and *Commiphora,* while scattered trees include *Balanites, Delonix, Diospyros,* and *Euphorbia.*

Boran Cattle

Peckover is perhaps best recognized in East Africa for his top quality Boran cattle; he consistently captures premium honors with his young bulls at the Nairobi Stock Show. The cattle grazed are of Boran breeding developed from centuries of selection by the nomadic Boran tribesmen of Kenya's arid Northeast Province. This breed now represents a foundation line in East Africa which will become more popular as the pastoral areas are brought into production (Fig. 1).

Bulls that don't measure up to the desired show class reputation are offered at a considerable discount to neighboring Masai and Wakamba ranchers for improving their hardy but small East African Zebu (*Bos indicus*) cattle (Mason and Maule, 1960). When cross bred with exotic western cattle, the Zebu produces offspring with the usual hybrid vigor. But experience in tropical husbandry has shown that when crossbreeding evolves too far from Zebu blood lines, heat tolerance and immunity to disease breaks down.

Despite environmental handicaps, cattle production on the ranch compares well with the average North American operation; by East African standards, the output is first rate. Annual calf crop is 80 percent and death loss about 5 percent. In more advanced parts of adjacent Masailand, calf crops seldom exceed 50 percent and death losses are about 15 percent.

Weaning weights at 9 months of age on the ranch exceed 400 pounds and most brood cows have reached 1,000 pounds by the age of 3 years. Steers are marketed as they become ready off grass at about 3¹/₂ years.

Slow growth and late maturity is characteristic of Zebu cattle, especially the variety raised by the Masai. In pastoral regions mature cows seldom exceed 600 pounds and may only calve at intervals of 18 to 24 months. Since milk for human food is the main concern of the pastoralist, calves are not really weaned but are herded separately from their cows during daylight hours.

Perhaps the most detrimental practice is allowing heifers to breed before they are strong. Bulls are always with the cow herd, however breeding generally occurs during the flush of green forage following onset of the rainy seasons. Both bulls and cows are often kept until age renders them unserviceable.

Ranching Problems

Cattle and grazing management of the Peckover Ranch is similar to that of a well developed ranch in the western Gulf Coast upland scrub range of the United States. However, customary methods of extensive ranching in East Africa, regardless of ownership, are much different.

Handling Cattle

In East Africa it is an accepted practice to hold cattle herds in a stockade each night. This corral helps protect cattle from predators as well as theft, both of which are still considerable problems in East Africa. Since night stockading in tropical areas means grazing time is cut to 12 hours or less, normal cattle growth is retarded. When night grazing is possible, animals are ready for market 6 months earlier and yearling weights can be 100 pounds heavier than stockaded animals.

Under intensive management, night paddocking provides continuous grazing and calves are with cows. At the Peckover Ranch night pastures are smaller units on the more productive bush free rangeland. The somewhat heavier night grazing with high manuring on naturally good sites often converts these limited areas into short Stargrass (Cynodon dactylon) pastures which are very desirable as nutritious late season forage.

Nearly all cattle grazing in East Africa is conducted under the surveillance of a herdsman. Mobs numbering from 75 to 150 head graze in tight formation. From centuries of natural and intentional selection for the flocking instinct, the indigenous Zebu has become very gregarious; a trait that takes a year or more to break when no longer required.

The ranch is now half fenced into 18 paddocks none of which exceeds 400 acres. Water piped to central points serves 3 or 4 units. On the remaining, open range cattle are loose herded to and from water and in and out of night paddocks. All cattle are trailed to the plunge vat on the weekly dipping day and cows ready to calve are cut back to the drop pasture near headquarters. Salt and minerals are liberally provided.

In contrast pastoralists and their cattle migrate between wet and dry season grazing depending on availability of grass and water. Family huts are within a large temporary thornbush stockade where corraling permits the daily milking for food. Each morning calves are separated from cows to graze near the corral. When cows are returned from distant grazing, calves are allowed to suckle but only after the family requirements have been taken.

During the wet season cattle need not be trailed to permanent watering points, however as grazing progresses into the dry season the trek to water begins. In time, some herds are eventually forced to spend one day trailing to water, one day trailing from water, and spend the day between grazing where grass is available. Dips are not common but these cattle have some natural immunity to tickborn diseases. Except for a seasonal trek to natural salt licks no supplements are provided.

Bush Control

One of the thorniest problems on the Peckover Ranch, and equally the scourge of nearly all grasslands in Africa, is bush (brush) encroachment. The rangelands of East Africa are secondary "savannas" or derived grasslands which have been maintained in sub-climax to bush through repeated burning. It is not unlike mesquite or chaparral ranges in parts of the Southwestern United States. The Peckover Ranch has a two-pronged attack on bush that is successful and inexpensive.

Slashing and Stumping.—The first and conventional method is selective hand clearing with stumping or grubbing. The larger woody material is cut and prepared for charcoal on the site (Fig. 2).

The operator permits the neighboring Wakamba to make and sell the charcoal, retaining only the



FIG. 2. Proper bush clearing for charcoal and beef production involves (upper left) slashing and grubbing to retard sprouting; (upper right) piling and bedding larger woody material in dry grass, sod and dry soil. After 5 to 7 days of burning, the charcoal heap is unearthed, (lower left) sorted and sacked for shipping. The finished product (lower right) is viewed by the rancher and 2 members of a burning gang. (Last photo courtesy of *East African Standard*.)

right of selecting "leave" trees and inspecting when the clearing job is finished. For their labor the Wakamba realize between \$4 and \$8 per acre, and within a year the grazing capacity is doubled in the cleared paddock.

This bush operation is providing part-time employment for about 200 people who otherwise could only subsist by seasonal peasant farming. About 5 clearing and burning gangs of 40 people each have, over the past 3 years, cleared nearly 3,000 acres.

Charcoal making for export to Arabia has recently taken new dimensions. Tonnage from the port of Mombasa has jumped from 2,500 to over 20,000 between 1967 and 1968. With proper tree selection and area regulation, this industry could mean a partial solution to Kenya's bushland control and unemployment problem.

Chemical and mechanical bush control is still in its infancy (Bently, 1963). Some sprays are effective against certain species, other species resprout and are very resistant. A major limitation against wholesale control is that many bush and tree species are desirable dry season browse. Moreover, few modern methods are as yet cheap enough to be commensurate with land values and production benefits in East Africa. Controlled burning can be successful in suppressing regeneration but as a rule does not eradicate established bush.

Natural Defoliation.—A second method used on bush is proving successful and is sure to become even more profitable. This uses East Africa's most publicized range resource, big-game. In the great drouth of 1960, before much of the Peckover Ranch was fenced, wild ungulates from the plains were attracted to the developed water supplies and grass reserves. Although most of the migratory zebra, wildebeest and hartebeest left when outside conditions improved, many giraffe, eland and impala stayed.

At first Peckover became alarmed especially about the large foraging eland, agile brutes which weigh 1300 to 1500 pounds. However, the more he observed game feeding habits, the keener he was to keep them. It turned out that most of these animals were very selective and thus compatible among species and even with cattle. There is now an esti-



FIG. 3. Giraffe and eland team up to convert scrub bush and woodland thicket into higher producing Tsetse-fly free grassland for cattle. Note the volume of standing dead woody material killed by constant browsing within the paddocks.

mated game biomass of 70 tons of semi-domestic animals which are content to call the range home (Denney, 1970).

Eland are browsers that make particularly good use of forbs. They keep resprouting bush regeneration grazed down and even hedge evergreen bush in the uncleared paddocks. The giraffe, of course, finish the hedging job by removing foilage up to treetop levels. Despite their daily requirement of 40 to 50 pounds of leaves and twigs, giraffe are very delicate foragers. Prolonged defoliation eventually kills the bush and trees (Fig. 3).

A common question is how wild animals react to cattle and fences. Peckover says their close association with cattle and herdsmen has made them very tame. Eland mix well with cattle and are easily herded from one paddock to another (Fig. 4). Giraffe can step over fences but keep pretty well to the bush where their forage is.

A big difference in the wild animals on the ranch is that they have never been shot at as hunting is not allowed. However, Peckover now feels he must begin harvesting surplus impala rams. There are 350 impala and they do compete with cattle for grass. Techniques for night shooting, silencer guns, capture rifles and other devices for selectively cropping animals without disturbing the remaining herds are being investigated.

When asked about the practicability of running game with livestock, Peckover says he is raising a product that costs nothing, benefits the rangeland, and is immune to Tsetse fly and most diseases. Moreover, wild animals are better red meat convertors than cattle. This latter attribute is a fact only recently confirmed (Talbot et al., 1961) and will become more important as markets are developed.

Semi-pastoralists have nearly eliminated wildlife



FIG. 4. This young cow and bull eland are searching for browse as they graze alongside two Boran steers interested in grass. Giraffe were responsible for the 20-foot highline on the evergreen Combretum tree (left) that grew out of reach.

from their regions. Here, game is killed as a source of food and because they destroy crops. Most pastoralists, however, consider game with indifference. Even though game are using their forage and water, transmitting disease and killing their livestock, the pastoralists traditionally tolerate game. This is compatible with the new development moves in East Africa which view game as sources of income to be conserved.

Game and Cattle Poaching

Although the big game on the ranch are immune to most adversities affecting cattle, one threat to these herds is poaching or illegal hunting. Last year, 30 eland were lost to poachers. Not long ago, 3 giraffe were killed by poison arrows.

On nearby pastoral rangeland both game and cattle poaching is still a problem to the government. Organized game poaching has nearly been defeated within national parks, and police stock theft units are being mobilized for dealing with stock raids. However, Turkana and Suk tribesmen of the northwest Rift Province are continually warring over cattle despite police efforts.

Cattle theft on this commercial ranch has nearly been eliminated. The last serious theft in the region was in 1962. That year Wakamba avenged repeated petty Masai theft by stealing 8,000 cattle in a nearly bloodless night raid. Over the next 2 weeks it took several detachments of police to restore calm.

Predators

Carnivorous animals pose one of the biggest losses to the Peckover Ranch. Because cattle are not placed in stockades at night, they are vulnerable to predator attack. During the last 5 years, an average of 25 cattle a year were lost. Sixty-four lions were killed within or near the ranch over the past 18 years.

Other predators include the hyena, Cape hunting dog, leopard, and cheetah. Cheetah only threaten game, contrary to the lions who prefer beef.

Leopards pose a minor problem to cattle, but they are more vicious in attacking the dog pack at the ranch. This pack of mixed breeds has only one thing in common-they all enjoy hunting the big cats.

Animal Health

Controlling insects and diseases is a considerable ranching expense, perhaps the largest in this tropical region. On the Peckover Ranch, however, the losses are only 2 percent and they no longer are a limiting threat. A central dipping vat and lately a more modern spray race furnishes protection from ticks and most other vermin.

Avoiding tick-born diseases, mostly East Coast fever,*³ heartwater,* redwater and Anaplasmosis, calls for weekly dipping or spraying. Preventative measures are routine for foot and mouth disease,* rinderpest,* contagious bovine pleuro-pneumonia,* leptospirosis, blackquarter (blackleg), anthrax,* malignant catarrh, and tuberculosis.* Precaution is needed for at least a dozen other less important diseases.

Tsetse fly which transmits trypanosomiasis (sleeping sickness)* is not the menace that it was several years ago. Though the cattle are on drugs during the rainy seasons, the bush control program is also paying dividends in this respect. Tsetse fly require the cool, moist habitat of a heavy canopy in which to thrive and opening the bush restricts their movement and limits reproduction.

Poisonous plants are not a serious bother but local Cassia plants causing a skin necrosis, like photosensitization, are troublesome in certain seasons. Last year nearby Masai cattle were especially afflicted when the plant became superabundant on their range following heavy rains that were preceded by an intense wildfire. The dozen or so varieties of poisonous snakes account for greater stock loss than poisonous plants.

Measles which are encysted tapeworms present a constant source of carcass condemnation, especially in cattle from pastoral regions. Cattle are the intermediate host and people are the primary or adult host. Improving human sanitation through education is the only answer to preventing this national loss in product value.

Marketing Barriers

The Peckover Ranch is adjacent to the historic Uganda Railway and former caravan route to the

port of Mombasa. Seventy miles upcountry, near Nairobi, is the central Kenya Meat Commission (KMC) abattoir.

Producers who are fortunate to be so close to the East African Railways can sell directly to KMC. Occasionally auctions are held in pastoral districts where producers may sell to traders or government buyers. Then trailing along established stock routes is the common practice.

Marketing and producer prices are regulated but not retail meat. Prices for beef animals seem low, but are not far below western standards when quality is considered. Recently the ranch shipped a small lot of "good" 3¹/₂ year old steers to KMC; weighing between 575 and 600 pounds cold dressed,⁴ they brought \$150 to \$200 each.

Lengthy quarantine is a continuing barrier to marketing and movement throughout all range areas. A nearby neighbor, the Nguu Cooperative Ranch, marks the western boundary of a large area closed because of pluro-pneumonia. Quarantine for foot and mouth disease has been in force in part of Kenya's Rift Valley for nearly a year, blocking the movement from a much larger cattle producing area. Not only are certain meat exports halted by quarantine, but pastoralists who are willing to sell can not. Big game hunting is usually disrupted and a general meat shortage can result.

Technology has only recently removed many of the natural limitations on animal numbers permitting a buildup in the pastoral herds in East Africa. An incentive to remove surpluses is now necessary.

An FAO pilot project underway may lead to a feeder industry. If successful, this feedlot system would encourage moving immatures off the range as long-yearlings rather than as 4 year olds thereby easing the over stocking problem. At the same time growing surpluses of low quality grain would be put to use.

Range Management

Basically, concepts of grassland management are the same here as for temperate climates from which they were developed (Heady, 1960); plant response, nutrient reserves, soil moisture, competition, succession, etc., all apply. With only minor modification, range management principles, such as levels of stocking, systems and seasons of grazing, suitability, and animal distribution are equally important.

Grazing Management

The Peckover Ranch is operated on a long term grazing capacity of 7 acres per animal unit per year; this excludes big game and 1,500 acres of bushland which will not be usable until water is developed and bush eradicated. With eventual control of bush,

³ Serious epizootic diseases that must be reported by law are shown with an asterisk*.

⁴ Since condemnation is common, KMC buys only on a cold dressed carcass weight.

which may take 10 to 12 years, stocking could be raised to about 5 acres per adult beast yearly.

Actual stocking within cleared paddocks approaches 2 to 3 acres per animal unit year over a period of 2 or 3 months. After the required rest period which is 4 to 5 months, stocking goes down to between 6 and 8 acres per animal unit year.

Ranching experience here shows short intensive grazing followed by rather long rest periods offers high animal production while reducing the natural grazing selectivity which favors unpalatable plants. This also discourages the taller less desirable grasses and tames the pasture into lower spreading more nutritious species.

The grazing system first used was the 3 herd-4 unit method where herds constitute cows with calves, heifers and weaners, and beef animals. This simple system involves light seasonlong grazing for each herd with the fourth paddock for reserve resting. Sometimes a fifth is used for burning and resting. This proven system has been recommended elsewhere as the first step in the transition from nomadic pastoralism to permanent ranching.

The present ranch system uses 3 paddocks per herd. During each 6 month green-to-dry grazing season, each paddock receives about 2 month's grazing and 4 month's rotated rest.

Forage Production and Drought.—Forage production varies tremendously from season to season. Out of 10 seasons 6 might be subnormal of which 2 or 3 may only produce half of the average forage supply; one is likely to be a failure producing essentially nothing. The best of the above average seasons may produce more than 2 times the normal supply.

Drought frequency has been calculated for a meteorological station 10 miles from the ranch. Records there show an expectancy of 6 months of continuous drought about every 8 years. During 1 in 10 years or 20 seasons that station gets no more than 2 inches of rain. Moreover, meteorologists point out that the first one-half inch of rain in any storm period in the arid tropics is not available to plants due to high evaporation.

In 1960, a record drought coupled with overstocking killed an estimated 350,000 head or 60 percent of the cattle in the Kajiado District which occupies half of Kenya Masailand. Within this district and adjacent to the Peckover Ranch, 7,500 people of the 850,000-acre Kaputiei Section lost about 75,000 head. Today, stocking is about half of predrought years, but is within the estimated capacity.

Forage Reserves and Fire.—Since forage preservation and supplemental feeding is nearly unheard of in East Africa except in the case of mineral deficient range, reserve grazing blocks are essential. Peckover recommends that in semi-arid pastoral areas having very undependable rainfall it is advisable to carry over at least 25 percent of the range as unused grass.

FIG. 5. The East Africa Section of the Society for Range Management visits the Peckover Ranch to learn new approaches to old problems. Viewing the stud herd on a cleared paddock offers a glimpse at the upper limit of the region's rangeland

potential expressed under integrated land use.

Although reserve pastures are mainly insurance against drought, they also allow greater flexibility in animal management, bush control, and burning measures.

At the end of a good forage season these unused reserves can be control burned to further discourage bush encroachment. Though many progressive East Africa ranchers maintain a "no burn" policy, they may end by paying more for bush control.

Burning is the only practical large scale control measure available for extensive ranching. Fortunately, burning is traditional in pastoral areas; but, unfortunately, this burning is premature, uncontrolled and too frequent for effective bush control. Ironically, bush often gets established during successive seasons of heavy grazing when the range becomes fireproofed by removal of fuel.

Because wildfire in a matter of hours can remove all trace of reserve forage, firebreaks are the first consideration of permanent ranching. They also serve as boundaries and demark grazing paddocks in the absence of fences.

The Peckover Ranch has a road system between paddocks to serve as breaks; on the open range sections, a double track plow line prevents the spread of fire. A bushcleared center lane up to 100 feet wide is then burned clean before fire danger is high.

Pastoral Progress

In East Africa disease, drought, wildfire and marketing problems are common. One or more of these factors is always operating and largely beyond the rancher's control. Management in the dry tropics must be flexible.

Ranching at a profit against such odds takes a good manager who recognizes the long term benefits of maintaining basic resources to protect high



investments. Profit motivation is a concept not understood or accepted by the majority of pastoralists in East Africa. Cattle production is not yet a business but a way of life.

Until conformation means more than the color of a cow and quality more than quantity, progress will be slow. The traditional grazing practices that have stagnated livestock production must be modernized through better but simple methods that provide for a gradual change. The Peckover Ranch is an example of how the art of range management can fill the gap for an improved pastoralism in East Africa (Fig. 5).

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