

Range and Livestock Characteristics of Paraguay

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Highlight

Paraguay, located in the central part of South America, has an area of 157,000 square miles (40.7 million hectares). The country is divided into two geographic-physiographic areas: the eastern area with 40 percent of the land and relatively high precipitation; and the western or Chaco region with 60 percent of the land area and a semi-arid type climate. The economy of the country is based primarily on livestock and forest products. The efficiency of beef production in Paraguay is lower than in many other countries because improved management techniques are still being developed. The rangelands have a high potential for forage production, but many are overgrazed and subjected to improper burning. In general, the future of the ranching enterprise in Paraguay is bright. With added technical assistance and more and better trained Paraguayans, Paraguay has the potential of becoming a leading agricultural nation in South America.

Algunas Caracteristicas de las Praderas y del Ganado del Paraguay

Rusumen

Paraguay, localizado en la parte central de America del Sur tiene una superficie de 400,000 kilometros cuadrados. El pais se divide en dos unidades geograficas-fisiograficas; (1) la Region Oriental, con una superficie que abarca el 40% de las tierras del pais, con topografia ondulada y buenas precipitaciones durante el año y (2) la Region Occidental, o Chaco, que ocupa el 60% de las tierras, con una topografia plana y un clima semiarido. La economia del

pais esta basada en la agricultura, ganaderia y produccion forestal. La ganaderia, de la cual la explotacion de bovinos es la mas importante, posee el potencial necesario para una mayor expansion y desarrollo.

Paraguay is one of the smaller countries of South America. It is roughly the size of California with an area of 157,000 square miles (40.7 million hectares). It is located in the central part of South America between latitudes 19°S and 28°S, and longitudes 54°W and 63°W. Paraguay is an inland country surrounded by Argentina, Brazil, and Bolivia and depends on the Paraguay and Parana rivers for access to the Atlantic Ocean. The country is divided by the Paraguay river into two geographic-physiographic areas: the rolling, humid eastern region with 40% of the land, where most of the population is concentrated, and the semi-arid alluvial western region, or Chaco, with 60% of the land area.

The population of the country is about 2,000,000, of which 63.5% is rural. The mean population density is 5 persons per square kilometer, ranging from 67 in the eastern region to 0.4 in the western region.

The economy of the country is based on production of tropical and sub-tropical crops and products of the natural forests and grazing lands. The country has few mineral resources and little industrial development.

General Environment

The eastern region is undulating to rolling with elevations ranging from 50 meters above sea level to 830 meters in the hills. The Chaco region is mainly flat and with an average elevation of 400 feet.

The climate of the country is, in general, continental subtropical with a well defined seasonal

Table 1. Number of livestock by species in Paraguay.¹

Species	Number
Cattle ²	
Beef	4,815,000
Dairy	646,000
Horses	673,000
Sheep	438,000
Goats	48,000

¹ Data from "Secretaria Tecnica de Planificacion."

² Principal beef breeds are native Criollo, Zebu, Zebu crosses and Hereford; dairy breeds are Holstein, Native and crosses.

rhythm during the year. The summer months (September–March) are hot and humid and the winter months (April–August) are cool and dry with some frosts. The mean annual temperature is 22.5C (72.5F) ranging from 26C (78.8F) in the northwest to 21C (69.8F) in the south and east. The mean annual precipitation ranges from 500 mm (20 inches) in the northwestern part to 1,700 mm (68 inches) in the south with about 1,350 mm (56 inches) at the capital city of Asuncion.

The main great soil groups are Ultisols (Red Yellow Podzolic) developed from granite, porphyry, sandstones and shales; Ultisols (Reddish-Brown Lateritic) soils derived from basalt, and Vertisols (Grumusols) derived from limestones and shales (Food and Agricultural Organization, 1964). Alluvial soils such as Ultisols (Planosols), Inceptisols (Humic Gleys), Aridisols (Solonetz), and Mollisols (Chestnuts) occupy the lowlands. The soils of the eastern region, with the exception of the Vertisols, are low in fertility and especially in available phosphorus and exchangeable calcium. The alluvial soils of the Chaco are high in salt and alkali in some areas. They have fair fertility but generally poor physical characteristics.

Cattle Production

Cattle are the animal species most utilized in Paraguay and beef is the dominant type of production (Table 1). The cattle enterprise is operated privately by individuals or companies. Four types of cattle operations can be found: cow-calf, steer production, mixed and fattening.

The principal beef breeds are the native Criollo, Zebu, Hereford, Santa Gertrudis, and their crosses. Herefords are predominant in the Chaco, which has 40% of the cattle. In the eastern region, which has 60% of the cattle, native Criollo, Zebu, and various crosses predominate. Among dairy animals, Holstein cows, native Criollo, and their crosses are mostly used. The dairy herds are found near the larger cities. Sheep and goats are kept on most ranches for food. Chickens are also commonly used for meat. There is very little refrigeration and

Table 2. Production characteristics of beef cattle in Paraguay.¹

Average Final Sale Weight	348 k (767 lb)
Net Yield per Animal	170 k (374 lb)
Time to Final Weight	3–5 years
Percent Calf Crop	30–40%
Average Annual Mortality	6.1%

¹ Data from "Secretaria Tecnica de Planificacion."

these small animals are easily consumed before spoilage.

The efficiency of beef production is lower in Paraguay than in many other countries (Table 2). The principal reasons are generally too severe grazing, lack of or deficient supplemental feeding during critical seasons, inadequate watering and fencing, insufficient control of animal parasites, pests and diseases, and transportation and marketing problems. Cattle in Paraguay are grown and finished on the range with little or no supplemental feed.

Rangeland Characteristics

The principal natural plant formations of the country include: broadleaf evergreen forest, semi-deciduous forest, parkland, palm savanna, grassland, dry forest and swampland vegetation (Fretes, 1967). Climatic and edaphic factors are the controlling influences of this wide variation of vegetation types.

Forty percent of the total surface area is grazing lands (Table 3). Plant formations of grazing value include the grassland, parkland, savanna swamplands, and parts of the dry forest (Fig. 1). Approximately 30% of these grazing lands is seasonally covered by flooding waters, 30% is subject to light to severe invasion by undesirable plants such as species of *Prosopis*, and 25% has agricultural potential for subtropical crops or improved forage species. Only 1% of the 16.2 million hectares of grazing lands is used as tame pasture. Nearly 71 percent is native range and grazed year round while 28 percent is native but grazed seasonally. Table 4 summarizes the principal grassland types and their main characteristics and Figure 1 shows the distribution of these grassland types. The grass family

Table 3. Current land use in Paraguay.¹

Land use	Hectares	Percent
Cultivation	1,627,000	4
Grazing Lands	16,270,000	40
Forest Lands	21,964,000	54
Non-agricultural Lands	813,000	2
Total	40,674,000	100

¹ Data from "Secretaria Tecnica de Planificacion."

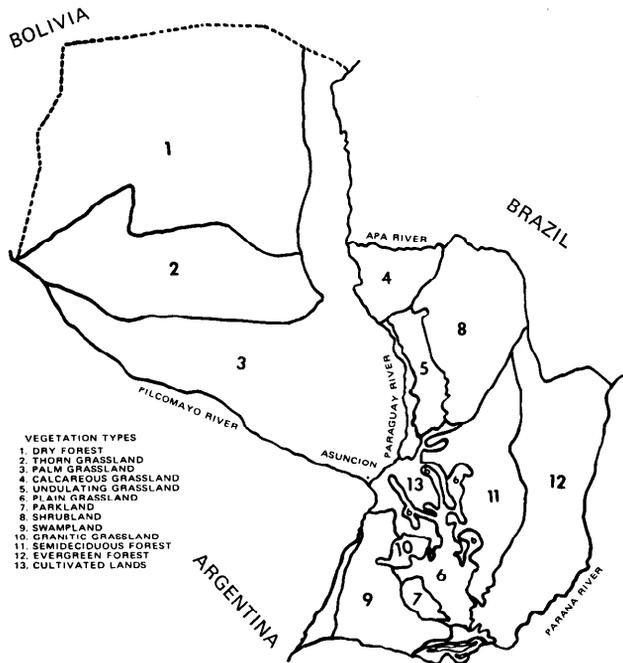


FIG. 1. Vegetation types of Paraguay. The Paraguay River divides the country into the "Chaco" or western region and the eastern region.

is dominant in the Paraguayan grasslands, with about 300 species. However, only 50 species can be considered important with regard to area covered and forage production. Few legume species are present, with few individuals per species, and they cover so little area that they contribute very little to forage production or quality.

The majority of the species are warm-season perennials, with little winter production. Species of low palatability cover important areas in all grassland types. These create a real problem because of the selective pressure of the grazing animals on the palatable species.

The grass is deficient in protein in all grasslands except during the growing stage. Grasses are also deficient in phosphorus and calcium during all seasons in most grassland types of the eastern region.

Some toxic plant species are scattered throughout the grazing lands and it is known that a high percentage of the cattle mortality is due to plant poisoning. The species responsible for the most livestock poisoning are *Baccharis coridifolia*, *Ipomoea malveoides* and *Asclepias curassavica*.

Range Management

With few exceptions, modern ranch and range management practices are still unknown among ranchers, and the natural grasslands are being exploited as though they were an endless resource. Burning is a common practice utilized annually

Table 4. Characteristics of various grassland types of the important grazing regions of Paraguay.

Grassland Types ¹	Area (ha)	Foragg Prod. ² (Kg/ha)	Animal Units (ha/yr)	Dominant Grass Species
Park	75,000	10,000	1.0	<i>Paspalum notatum</i> <i>Axonopus compressus</i> <i>Axonopus affinis</i> <i>Sorghastrum nutans</i>
Shrub	1,731,000	3,500	0.3	<i>Elyonurus latiflorus</i> <i>Tripsaccha dactyloides</i> <i>Trachypogon montufari</i> <i>Aristida pallens</i>
Granitic	64,000	5,500	0.5	<i>Paspalum notatum</i> <i>Axonopus affinis</i> <i>Andropogon lateralis</i>
Calcareous	750,000	5,000	0.5	<i>Elyonurus latiflorus</i> <i>Imperata brasiliensis</i> <i>Paspalum notatum</i> <i>Axonopus affinis</i>
Undulating	550,000	6,000	0.6	<i>Elyonurus latiflorus</i> <i>Andropogon lateralis</i> <i>Paspalum notatum</i> <i>Axonopus affinis</i>
Plains	1,400,000	9,000	0.9	<i>Axonopus compressus</i> <i>Axonopus affinis</i> <i>Andropogon lateralis</i> <i>Sorghastrum agrostoides</i>
Swamp	1,200,000	7,000	0.3	<i>Panicum prionitis</i> <i>Panicum laxum</i> <i>Paspalum alnum</i> <i>Paspalum notatum</i> <i>Andropogon lateralis</i> <i>Leersia hexandra</i>
Thorn	3,562,900	3,500	0.3	<i>Diplachne unineria</i> <i>Elyonurus latiflorus</i> <i>Spartina argentinensis</i> <i>Sporobolus pyramidatus</i> <i>Trichloris pluriflora</i>
Palm	5,000,000	4,000	0.4	<i>Hemarthria altissima</i> <i>Panicum prionitis</i> <i>Elyonurus latiflorus</i> <i>Sorghastrum agrostoides</i> <i>Cynodon dactylon</i> <i>Paspalum alnum</i>

¹These types occur in the grassland, parkland, savanna and swampland.

²Preliminary estimates based on relatively few samples.

at the end of the winter season to eliminate dry material left from fall and to make growth available to animals.

Overgrazing occurs most frequently because there is no adjustment of animal numbers with relation to fluctuations in seasonal forage production. Also, other factors such as flooding reduce the accessibility of certain areas and concentrates livestock on the unflooded areas. Overgrazing also occurs after burning when production is too low to support the number of animals carried through the winter. The only grazing system used is continuous grazing with uniform cattle numbers through the year.

Because of these factors, visible degradation is easily observed throughout most grasslands. Undesirable species of weeds, brush and toxic plants have increased tremendously. Plant cover has been reduced and erosion problems are beginning, especially in the highlands of the eastern region.

In Paraguay the ideal pasture size is considered to be one "legua," 1,875 hectares. This pasture would generally graze 400-500 animal units. "Legua" sized pastures are more frequent in the Chaco than the eastern region.

Some selected native and many introduced grass

Table 5. Cultivated grass species used for dairy and beef production in Paraguay.

<i>Cultivated Species for Dairy Production</i>	
Elephant Grass	<i>Pennisetum purpureum</i>
Colonial Grass	<i>Panicum maximum</i>
Alfalfa	<i>Medicago sativa</i>
Rhodes Grass	<i>Chloris gayana</i>
Yaragua	<i>Hyparrhenia rufa</i>
Forage Oats	<i>Avena stregosa</i>
Rojas Grass	<i>Paspalum rojasii</i>
Ramirez Grass	<i>Paspalum guenoarum</i>
Annual Sorghum	<i>Sorghum</i> Sp.
Pangola Grass	<i>Digitaria decumbens</i>
<i>Cultivated Species for Beef Production</i>	
Pangola Grass	<i>Digitaria decumbens</i>
Buffel Grass	<i>Pennisetum ciliaris</i>
Yaragua	<i>Hyparrhenia rufa</i>
Rojas Grass	<i>Paspalum rojasii</i>
Ramirez Grass	<i>Paspalum guenoarum</i>
Colonial Grass	<i>Panicum maximum</i>
Para Grass	<i>Panicum purpurascens</i>

species have been used successfully in the dairy production of Paraguay (Table 5). For beef production, plant introduction is still in the experimental stage. General observations have been made on many ranches and research studies are being conducted at the Caacupe, Fernhein and Barrerito Experiment Stations and at the Facultad de Agronomia y Veterinaria near Asuncion.

Future of Ranching in Paraguay

The importance of the livestock enterprise in the development of Paraguay has been shown in the last few years, and many institutions are now trying to solve the principal problems that are retarding its growth.

The Banco Nacional de Fomento is helping

ranchers in the development of ranch management facilities through financial assistance. The Facultad de Agronomia y Veterinaria is making a big contribution by producing veterinarians and agronomists for government agencies and private enterprise, and also by making surveys and conducting research studies on the principal natural resources of the country. New Mexico State University is cooperating in these programs by lending assistance through agricultural experts helping to establish much needed research. The agricultural experiment station of Caacupe has been working for many years in the selection of improved forage species for Paraguay. The livestock experiment station of Barrerito has collected information on cattle breeding. The Fernhein experiment station of Filodelfia, in the Chaco region, has conducted grazing trials and animal performance studies on some introduced species as well as on native grazing lands. International assistance agencies such as Agency for International Development, Organization of American States, and Food and Agricultural Organization of the United Nations have also given much assistance.

All these facts point to a promising future for the ranching enterprise in Paraguay. Paraguay definitely has the potential of becoming a leading agricultural nation in South America.

LITERATURE CITED

- FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1964. Report on the Soils of Paraguay. World Soil Resources Reports 24. AID Mission, Asuncion, Paraguay.
- FRETES, R. A. 1967. The Grasslands of Paraguay. Facultad de Agronomia y Veterinaria (In Preparation). New Mexico State Univ., Las Cruces.
- SECRETARIA TECNICA DE PLANIFICACION. 1966. Diagnostico del Sector Agropecuario y Forestol. Ministerio de Agricultura, Asuncion, Paraguay.

2nd 10-YEAR INDEX

Edited by Donald W. Hedrick, Oregon State University, Corvallis (present address: Humboldt State College, Arcata, California), the 2nd 10-Year Index to the *Journal of Range Management* is now in press and will be ready for distribution by October 1. A complete listing of authors, titles, and subject matter, this new index covers JRM Volumes 11 through 20 (1958-67). It contains approximately 50% more entries than does the index to the first 10 volumes.

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