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Production Potential for Ruminants in the Lowland Tropics of Latin America

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A basic consideration in the agricultural development of the lowland tropics is that available resources be efficiently used. These resources include the land, the crops and the pastures grown on these lands, the domestic animals found in these areas, and the available agricultural manpower and their particular skills.

In this process, ruminants assume major importance in the utilization of grasslands that are not suitable for cultivation, and in the transformation of feedstuffs that are not destined for consumption by humans or non-ruminants into animal products.

Additionally ruminants are a tool for initially opening up new lands. Infrastructure and management skill requirements are minimal for the development of a beef cattle industry, and economic feasibility would often be better than that of other types of agricultural enterprises in these areas.

Ruminants have a primary role as a basic component of integrated crops-livestock and livestock production systems over a broad range of types and sizes of farming enterprises.

Utilization of grasslands that are not suitable for cultivation

There are extensive areas in Latin America with allie soils which are extremely acid, high in exchangeable aluminum, and low in phosphorus and other plant nutrients. Soils of this type prevail in the interior of South America supporting either savannah grass or forest vegetation.

Although soil fertility has been the principal constraint to development

of these areas, they nonetheless have the potential of supporting greatly expanded



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agricultural production. There are many well adapted plant species that tolerate extreme soil acidity and low fertility. These include native and introduced tropical grasses and legumes (for grazing by ruminants) and many food crops such as rice, cassava, cowpeas, mangos, pineapples and plantains.

Beef cattle production is the principal agricultural activity in savannah grassland areas, and will probably continue to be for the foreseeable future. Cattle provide the mechanism for the rational use of those lands which are not suitable for crop production, as well as the immediate utilization of potentially arable lands for grazing until necessary infrastructure for cash crop farming can be developed.

Production could be greatly increased in these regions. Currently native savannahs are not stocked to capacity. In addition, even limited replacement of native pastures with improved grass or grass/legume mixtures would increase production potential, particularly in providing adequate nutrient intake during the dry season and in supplying high quality forage needed during critical phases of the production cycle, ie, breeding season, weaning and fattening.

It is estimated that potential annual carcass beef production could be as much as 1.500.000 tons using presently available native grass pastures in the alluvial soil savannah areas (approximately 300.000.000 ha) in the interior of South America; as much as 4.800.000 tons if native pastures were replaced with improved grass pastures; and as much as 9.600.000 tons if replaced by grass/legume mixture (Table 1). Current carcass beef production in Latin America is 6.964.000 tons (FAO, 1972). These estimates are to indicate maximum potentials, but are not to suggest that it is likely that all present native grass pastures would be replaced with improved pastures in the foreseeable future. However, these data illustrate the tremendous increases that could be achieved with the establishment

of improved pastures. Since improved pastures would have a much greater incremental effect when used for the most critical phases of the production cycle, it becomes readily apparent that even the replacement of a small percentage of the native grasses with improved pastures could result in significant production increases. The principal and most important effect would be in increasing productivity per animal unit in the herd, ie increasing calving percentage and reducing market age.

Utilization of crop residues, by-products, cultivated forages, non-protein nitrogen.

Currently crop residues are little used, except in Mexico. Many by-product materials are either not suitable for human consumption, or demand is limited for use as food for human consumption or as feedstuffs for non-ruminants. Cultivated forages are sometimes used, most often as fresh chopped forage for lactating dairy cows. Non-protein nitrogen usage is limited.

Data presented in Table 2 illustrate how these types of feedstuffs can be advantageously used. These are results of investigations conducted in the Instituto Nacional de Investigaciones Pecuarias in Mexico. (Casas y Raun, 1963; Valadez y Raun; 1963 a y b).

Integrated crops-livestock and livestock production systems

1. Intensive systems on small farms

Cattle are found in most farm enterprises, including small farms. In Colombia, it is estimated that there are 977.747 farms of less than 20 ha: 323.219 of these have cattle totaling 2.283.691 head which represent 11.8 % of the total cattle population in Colombia (Ministerio de Agricultura, Colombia 1974).

In some instances, improved pastures might be used. An example would be the Los Angeles colonization project in Guatemala where 20 ha units are based on beef and milk production using beef type animals maintained on improved grass pastures. Research conducted at CIAT in the Cauca valley of Colombia indicates that as much as 1.358 kg/liveweight gain/ha could be produced annually with growing-fattening cattle grazing fertilized pangola grass (CIAT, 1974).

Cultivated forages would probably have greater advantage on small farm units of less than 10 ha where cattle are used for both beef and milk production. Such a system would be highly labor intensive, with an even distribution of labor requirement throughout the year, and would offer self-employment opportunities and the possibility of transforming family labor into cash income. At the CIAT center in the Cauca valley, liveweight gains of 2500 kg/ha/yr have been obtained feeding fresh chopped elephant grass to growing-finishing cattle (CIAT, 1974). Total productivity of animal products would be higher in a milk-beef enterprise.

Another example of a highly intensified crops-livestock system is a rice-elephant grass combination developed in Taiwan (Chia and Chang, 1965). They observed that a one hectare unit including 0.2 ha of elephant grass for dairy cows and 0.8 ha of rice was more profitable than rice alone. This system supported three animal units on a year round basis.

2. Intensive systems on medium to large farms

Highly intensified production systems for beef and dairy cattle are little used in the lowland tropics of Latin America. However as countries develop, the combination of increased demand for animal products, increasing costs of production and increasing competition for land will result in more intensive use

of available resources. In these instances, integrated crops-livestock systems will tend to have a comparative advantage in the utilization of farm produced feeds, farm labor and equipment. Possible feed sources for ruminants would include improved pastures, cultivated forages, crop residues and locally available by-products.

3. Milk-beef production in beef cattle herds

Almost half (925.277 tons) of the total milk production (1.102.132 tons) that enters commercial channels in Colombia comes from traditional beef cattle herds (Ministerio de Agricultura, Colombia, 1974). In addition sales of milk from these beef cattle herds account for a sizeable proportion of total farm income. In a survey conducted in the north coast of Colombia, Rivas (1973) observed that milk accounted for 33% of the total cash income from meat and milk on cattle farms of 0-200 ha, 30% on farms of 200-500 ha, and 13% on farms of over 500 ha. This is generally representative of other areas in the lowland tropics where milk enters commercial channels.

These data emphasize the current importance of milk production from beef cattle herds, and the potential for increased production through improved nutrition, management and breeding.

Table 1. Beef production potential of latosol grassland areas in lowland tropics of Latin America ^{a/}

<u>Pasture</u>	<u>Fertilizer/ha</u>	<u>Production/ha, kg</u>	<u>Total production, tons</u>
			<u>Carcass beef/yr</u>
Native	None	5	1.500.000
Improved grass	None	16	4.800.000
Legume grass	20-40 kg P ₂ O ₅	32	9.600.000

^{a/} Estimated to be approximately 300.000.000 ha

Table 2. Growing-finishing cattle in tropical regions using by products, urea, crop residues and cultivated forages.

<u>Ration</u>	<u>Live weight gain/head/day, gm</u>	<u>Feed efficiency</u>
1. Cottonseed meal, urea, molasses, corn cobs, corn silage ^{a/}	937	10.74
2. Safflower meal, urea, molasses, cottonseed hulls, fresh chopped sugar cane	1166	10.92
3. Safflower meal, molasses, fresh chopped sugar cane	1030	14.10
4. Safflower meal, molasses, cottonseed hulls	1370	12.78

^{a/} Urea - 200 gm/head/day

Source: Técnica Pecuaria en Mexico. 1963. No. 1 y 2

Table 3. Intensive growing-finishing systems using pastures and forages

<u>Forage</u>	<u>Nitrogen</u> <u>/ha/yr, kg</u>	<u>Animal units</u> <u>/ha</u>	<u>Live weight gain</u> <u>/ha/yr, kg</u>
Pangola grass pasture	572	8	1358
Fresh chopped elephant grass	850	12	2400

Source: Centro Internacional de Agricultura Tropical. 1974 Annual Report.

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