

# Pasture planning in Paraguay

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The Gran Chaco is a vast alluvial plain (800.000 km<sup>2</sup>) with erosion sediments from the Andes. This unique semi-arid to sub-humid region with summer rainfall stretches from about 16° to 25°S, and is shared between Argentina (50%), Paraguay (30%) and Bolivia (20%). The native vegetation is a drought-deciduous shrubland in the drier parts while the wetter parts are dominated by seasonally water-logged native grasslands and palm tree savannas (*Copernicia alba*).

## Land resource planning

South American governments are often blamed for allowing unrestricted clearing of forested land for pasture development.

Since the 1960s, fairly intensive grazing systems have been developed in the Paraguayan Chaco on land previously cleared and sown to Gatton panic, buffel grass and other adapted grasses. But about 80% of the Chaco is still almost undisturbed.



*Fields of Gatton panic have been planted in the Chaco over the past decades.*

*Land clearing guide lines for the Chaco aim to protect the resource while providing for new pasture development.*



There is strong and increasing pressure from the Paraguayan Government to respect a number of land use restrictions. Cattle farmers are no longer allowed to clear bush indiscriminately. Before clearing they have to present an approved land-use plan that comprises an inventory of the natural resources (vegetation, soil and water) and how to use them.

A minimum of 25% of the area of a farm has to remain untouched—preferably in one single coherent block. A bush corridor of 100 m width has to be left every 500 m of cleared pastureland and in an east-west-direction as the prevailing winds come from north and south.

No coherent piece of land bigger than 100 ha can be cleared unless it remains surrounded by a 100 m wide strip of bush. And adequate bush strips also have to be left around any kind of water source such as water camps, seasonal courses, lagoons, even if temporary, and areas prone to dryland salinity.

Thus overall, a maximum of 60% of a farm can be developed into grazing or cropping land, and in practise this is often less than 50%. In spite of ongoing corruption producing exemptions, the land use restrictions (surveyed on the ground and by satellite imaging) generally guarantee the creation of a diverse agro-ecosystem and an amenity park-like landscape.

I work for (INTTAS = Iniciativa para la Investigación y Transferencia de Tecnología Agraria Sostenible) so far predominantly financed by the AVINA foundation of Swiss origin. One of the objectives of INTTAS is to diversify pastureland cleared before the land use restrictions were implemented. This includes working together with farmers and local extension services on:

- diversification of available grass species
- integration of herbaceous legumes in pastures
- establishment and utilisation of leucaena
- the establishment of silvopastoral systems by the volunteer but guided regeneration of Algarrobo trees (*Prosopis alba* and *P. nigra*) in pastures.

### More grasses

Buffel grass was introduced from Texas into the Paraguayan Chaco in the 1950s. For some 30 years it was the only grass sown on any significant scale until buffel blight and other foliar diseases came in; it also showed limited persistence on sandy soils and intolerance to even short-term waterlogging. In recent years, the new Australian buffel cultivar 'Viva', which has so far has been totally resistant to the blight has been spreading slowly in the dry Chaco.

Buffel grass has been largely replaced by Gatton panic since the late 1980s. Gatton panic was introduced into the Chaco some 20 years after its release in Australia. Nowadays it is widely sown because it is easy to establish and seed is easy to harvest. It is also a strong reseeder, quickly thickening up poor stands.

In the 1990s, the Estación Experimental Chaco Central (a German Aid Project) and, since 2001, the INTTAS project have contributed greatly to the diversification of pasture grasses: *Urochloa mosambicensis* is now an ever more appreciated grass as it is a strong colonizer even in old pastures. Callide Rhodes is progressively spreading on heavy soils in the subhumid areas of the Chaco as is Bambatsi Makarikari grass. *Dichanthium caricosum* is another species slowly being adopted for clay soils.

More than 100 accessions of *Digitaria eriantha* and related species are being tested under real grazing conditions at farm level. We

hope eventually to be able to produce a seed mix of elite lines with superior persistence.

### Legumes

Numerous herbaceous legumes have been tested in small plots and on a larger scale under grazing. Under an average annual rainfall of 950 mm, *Alysicarpus vaginalis* (CIAT 17380), *Lotononis bainesii* (cv. Miles), and *Stylosanthes hippocampoides* (cv. Oxley) have continued to increase over the years whereas after five years, Siratro declined due to poor replacement of initial plants. Six years after the legumes were introduced into a grass pasture on formerly run-down cropping land, steers have consistently produced more than 400 kg of liveweight gain per hectare per year, with grass-legume pastures tolerating stocking rates of up to 2.5 steers per ha. These liveweight gains compare well with production obtained from freshly cleared, virgin bushland soils.

Legume seed multiplication and availability used to be a problem but, in the Paraguayan Chaco, legumes have been sown into more than 3000 ha of existing Pangola pastures.

### Algarrobo

Many species of *Prosopis* are considered as serious woody weeds in grazing lands in North America and Australia. However, our native *Prosopis alba* and *P. nigra* (algarrobo) produce a widely appreciated timber. Furthermore, their pods provide abundant feed for cattle and even food for indigenous people from October to December. Under-canopy grass growth is exceptionally vigorous and the canopies provide good shade. More and more farmers have decided to protect volunteer algarrobo in pastures at densities ranging from 10 to 50 trees per hectare, with some pruning to form a valuable trunk within 15 to 30 years. This silvopastoral system produces an amenity landscape and also sequesters carbon in grazing lands.



Pastures under spaced and pruned algarrobo in the dry Chaco