Animal traction in the Central Region of Cuba

by

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Summary

This study forms part of a project to evaluate animal traction in Cuba in order to identify the current limiting factors and develop proposals to improve the efficiency and the benefits of animal traction. The animal traction group of the Mechanization Department of the Agricultural Sciences Faculty of the Central University of Las Villas carried out a study in the three central Provinces of the country, Villa Clara, Cienfuegos and Sancti Spiritus. A specially designed survey was used, with a variety of farmers and relevant organisations. Interviews were held with key people in the provincial offices of the Ministries of Agriculture and Sugar in the three Provinces and data were obtained from the Statistics Departments.

*Animal traction is extremely important in all three provinces, with half a million hectares, or 25% of the cultivated land farmed using oxen. Horses are important for rural and urban transport, while mules have a special role as pack animals in the mountains. Animal power leads to significant fuel savings, relative to tractor use. One of the limiting factors is the shortage of implements and materials to make them. The theft of animals is another constraint. Most ox handlers (*boyeros*) are quite old, and there is a need to train young people to work with animals.*

Introduction and methodology

The survey was carried out between the months of April 1999 and September 2000 in the three central Provinces of Villa Clara, Cienfuegos and Sancti Spiritus. In selecting the interviewees, the aim was to cover a representative spectrum of those involved with animal traction in the region, starting at a high level with provincial managers knowledgeable about the national and provincial situation and future perspectives. Next were the managers of State regional enterprises who understand the situation in the region and know the results, needs and potential of animal traction in their enterprises. Finally, and most importantly, were a large number of representative farmers of diverse types. The majority had many years of experience with draft animals and knew about the benefits, difficulties and limitations of their use and future trends. Thus interviews were held with the heads of department and relevant people in the mechanization department of the Ministries of Sugar (MINAZ) and Agriculture (MINAGRI), the livestock section of MINAGRI and the small farmers association (ANAP). Also interviewed were the director of the agricultural implements factory in Camajuaní, Villa Clara and the directors of several State enterprises of livestock, tobacco and vegetable crops in the central region. Of particular importance were the interviews with farmers from the private sector and in agricultural production cooperatives (CPAs), service and credit cooperatives (CCSs) and basic units of agricultural production (UBPCs). In total, interviews were held with 12 provincial administrators, seven managers of State enterprises and 76 farmers.

Context

The context of animal traction in the central provinces is very varied, for the characteristics of soil, topography and climate as well as the dimensions and location of the areas where animal traction is employed.

In the central provinces the cultural and educational levels of the farmers are very variable. There are still some (mostly older people) with a low level of formal education. But the reality is that the vast

majority have a medium or high cultural level, with some achieving university education (Rivalta, 1999).

More than 50% of farmers in the region using animal traction are associated with UBPCs, CPAs and CCSs and receive help with animal care and implements from these organizations.

Farm size varies. Small private farmers generally have small farms of between 0.5 and 5 ha, although some are as large as 25 ha (Boyeros, 2000).

In general animal traction is used in almost all field work, but is used less for initial soil preparation (plowing). The reverse is true for other cultural operations (weeding, ridging, earthing-up and other similar jobs); and for transport of cane, seed, water, irrigation pipes, people, crop harvests, etc.

Typically the majority of farms have tracks and roads in acceptable condition which give quick and easy access to good quality highways that permit connection to areas of markets and crop delivery, input supply (seeds and fertilizer) and urban centers (Rivalta, 1999).

State of animal traction in the Central Region

In the fields of the central region, the most widely spread working animal is the ox. Usually they are used in pairs (*yuntas*), except in rare cases where single animals are used. This forms part of the ox-driver (*boyero*) tradition in Cuba since colonial times and is a deep-rooted custom resistant to change. There are some cases of single-ox use, but according to the survey, this is not more that 5%, and in some micro-regions it is zero. The greatest use of single oxen is registered in some mountainous zones of the Sancti Spiritus Province (Boyeros, 2000) and in agro-industrial complexes (*Complejos Agroindustriales* – CAIs) in Villa Clara Province.

The use of single *yuntas* is widespread, although for hauling heavy carts (loaded with wood or cane) over large distances, more than one *yunta* is used. Sometimes as many as four *yuntas* are used for hauling sugarcane, mostly in regions with wet soils located in the north coastal sector of the central region (Claro, León and García, 1998).

Apart from oxen, horses are widely used in the region. In 1999 the horse population in Villa Clara Province was 4965 and it was 3420 in Cienfuegos. But this is usually for riding, and is a great help to farmers for moving between fields and nearby areas with speed, comfort and ease. The horse is used a lot for managing flocks and herds. In this job the horse is vital and irreplaceable, given the difficulties associated with managing numbers of animals and their young without the aid of a good horse especially trained for this job. In the region there is no tradition of using horses to pull implements, neither alone or in pairs. A few cases were registered of farmers using a horse to pull cultivators, spike-toothed harrows and similar implements (Campesinos, 2000). But this use is not significantly important in the countryside of the region. Nevertheless in urban areas the horse is widely used for draft in the use of carriages, carts, gigs, etc for the transport of all kinds of cargo and, recently for transporting people about the towns over distances from 1-10 km. In the cities the horse is also used for the transport and distribution of firewood, food, milk, charcoal, ice, vegetables, root crops and other products, as well as for household garbage collection. Usually a single animal pulls the carts and, carriages and gigs may be pulled by two or four horses in pairs.

Mules are less numerous than horses, being used mainly in the mountainous regions of Escambray (Ezcurra, 1990). Here they transport coffee, palm nut and other products from highland farms with difficult access, to lowland areas where they are sold or processed. In the Sancti Spiritus region of the Escambray mountains there are 606 mules for coffee transport. Cienfugos has 492 mules and Villa Clara 521 mules, some of which are used to pull carts. Mules are often used in mule trains, with four to seven pack animals in file, joined with a rope pulled by the first guide animal that is mounted by the driver. Mules are docile and easy to manage and are capable of carrying more than half their weight. They are well adapted to steep difficult tracks, which can be dangerous for horses that have a more nervous and jumpy disposition.

Buffaloes are not used for animal traction in the central region. There have been several trials with working buffaloes in the north of Villa Clara, but they did not lead to any long-term use. There was

also some work with buffaloes in Sancti Spiritus Province in Venegas and in the rice production region to the south of Jíbaro (Boyeros, 2000). Again, there was no take up of the technology. This is partly because buffaloes are maintained in ranches or in dairy herds, and are not widely available in the way that oxen are.

There is no tradition of using cows for work. Farmers consider that the function of the cow is to produce calves and milk, and it would be an abuse of the female animal to replace oxen with cows. Similarly, there is much 'machismo' among farmers who consider hard farm work to be a male domain, with women responsible for domestic work and animal care. This partly explains why very few (if any) women are seen working with oxen: it is considered a male domain.

The *boyero* movement in the central region, as generally across the country, is sustained by elderly farmers with many years of experience. This puts the future of the movement at risk. The average age of farmers of the region is 47 and the distribution is as follows (Claro et al., 1998):

- *Boyeros* over 50 50 %
- *Boyeros* between 25 and 50 40 %
- *Boyeros* under 25 10 %

Goats are also used as draft animals are in urban zones, but to a lesser extent. They are used almost exclusively to pull small carriages with a capacity of 8-10 children. This is usually in the parks during the afternoons, weekends and holidays for giving fun-rides to children of 1-10 years over short distances of no more than 100 m. Their use is well perceived by Cuban society as an interesting and attractive relaxation for their children.

Most oxen (85%) in central region are crossbred animals, with a mixture of Zebu, Holstein, Creole and Brown Swiss genes. About 10% are pure Zebu, 3% are Brown Swiss and 2% are Creole.

The number of work animals in the central region is large and they are mostly concentrated with MINAZ and MINAGRI. Table 1 shows total numbers and their distribution by province.

Table 1. Numbers of oxen in the central region of Cuba in 1999

	Ministry		
Province	*MINAZ*	*MINAGRI*	*Total*
Villa Clara	14 302	29 630	43 932
Sancti Spiritus	3 105	15 966	19 071
Cienfuegos	3 974	2 904	6 878
TOTAL	**21 381**	**48 500**	**69 881**

Source: Departamentos de Control Pecuario Provinciales y Departamento de Estadísticas MINAZ de Villa Clara, Cienfuegos y Sancti Spiritus

Farmers' recommended methods for the selection and training of animals (ANAP, 2000)

When selecting an ox for integration in a *yunta*, it is important to bear the following in mind:

- Select an ox of between 12 and 18 months of age. Younger animals are too immature and do not have sufficient strength yet; older animals will have developed bad habits which makes for difficulties when training for the yoke and working in pairs.
- It should have a good height or size.
- Strong and straight horns are a fundamental requirement.
- The animal should have big ears.

Farmers' recommended methods for training of animals

The training process should follow the following steps (according to local criteria):

- Tether with a long rope in a pair to graze, drink, rest and other activities. The idea is to accustom them to the smell, presence and movements of the other animal.
- Fit a nose-ring and attach to the *yunta* partner to accustom the animals to move together for all activities during several days.

- Yoke the animals daily and leave them with the yoke for several hours whilst they move freely, eat and drink.
- They need to be slowly adapted to the yoke, to voice commands and guides.
- Finally light work must be practised for short periods. This will gradually increase the training process until the animals are completely broken in.
- Animals should be specialized for a specific task, for example walking oxen for carts, a *yunta* for pulling heavy loads, for plowing and crop-care jobs, etc.

Farmer innovations

In some places, farmers use a special yoke to train a third animal that has proved to be difficult to break-in. However, other farmers do not approve of this method as it is seen as an imposition for the animals. Oxen do not learn from force, but rather from dedication and patience.

Another special type of yoke has four loops of rope to harness without straps. These loops are simply passed over the horns of the oxen that are then ready for work without the need for forehead pads (*frontiles*) or straps.

The traditional method of covering seeds is with the foot. In the Remedios (Villa Clara) area there is one farmer who covers seeds using a bar 30 cm bar of 2 cm diameter iron, pulled by a pair of oxen (or a single ox or a horse). This is pulled across the furrows with good results.

Qualitative analysis of animal traction in the Central Region

Animals

- There is an inadequate attention to the animals in the areas of feeding, veterinary assistance, security and protection.
- The low productivity of oxen is evident as a result of inadequate feeding, use and management.

Equipment

- Improved animal traction implement design is needed.
- Blacksmiths, makers of yokes and other artifacts for animal traction are practically non-existent along with people dedicated to implement repair.
- There is a need for diversifying the present range of implements and for introducing other novel designs to the country.
- The number of implements available is insufficient.

Social and economic issues

- The lack of a training program for *boyeros* with the aim of assimilating new technologies
- An urgent requirement is to find and train young people for managing and caring for oxen. This is with the aim of replacing the existing cadre, given that most *boyeros* are over 50.
- Rustling and killing livestock affects the stability of established *yuntas* and the economy of the farmers.
- There is a generalized lack of resources and inputs to satisfy the needs of farmers who systematically use animal traction.
- The *yunta* training program suffers from a lack of uniformity and monitoring.
- There are objective limitations to the acquisition of material resources. And those supplied are of insufficient quantity and inadequate quality.

Table 2. Number of enterprises and organizations which use animal traction

Province	*Organisation*	*Enterprises*							
		UBPC	*CPA*	*CCS*	*CAI*	*Vegetable enterprise*	*Livestock enterprise*	*Tobacco and coffee enterprise.*	*New style state farms*
Villa Clara	MINAZ	127	42	58	28**				3
	MINAG	76	52	227		13	8	2	
Sancti Spiritus	MINAZ	71	29	37	9**				5
	MINAG	109	37	104	1*	3	9	3	12
Cienfuegos	MINAZ	59	24	26	12**				6
	MINAG	52	41	138		13	37	2	3
Total		**494**	**225**	**590**	**50**	**29**	**54**	**7**	**29**

Source: Departamentos de Control Estadístico del MINAZ y del MINAGRI de Villa Clara, Cienfuegos y Sancti Spiritus

UBPC = Basic unit of cooperative production
CPA = Agricultural production cooperative
CCS = Credit and service cooperative
*CAI = Agro-industrial complex, *CAI rice production, **CAI sugar production*
MINAZ = Ministry of Sugar
MINAG = Ministry of Agriculture
New style state farms (Granjas de nuevo tipo) have greater independence in their funding and management

In addition to the enterprises shown in Table 2, there are numerous State farms and related enterprises that use animal traction in those parts of their land designated for 'self-sufficiency' (the growing of crops for consumption by the staff). These include state farms whose primary function is to produce pigs, poultry, seeds, coffee and honey and state enterprises involved in equipment production, transport, agricultural inputs and services.

Table 3. Area cultivated by oxen in the three central provinces in 1999

Province	*Organisation*	*Total area cultivated (ha)*	*Area cultivated with oxen (ha)*	*% cultivated with oxen*
Villa Clara	MINAZ	360 000	120 000	33
	MINAGRI	553 000	147 000	27
Sancti Spiritus	MINAZ	215 000	63 000	30
	MINAGRI	397 000	49 000	12
Cienfuegos	MINAZ	257 000	36 000	14
	MINAGRI	505 000	130 000	26
Total		2 287 000	548 000	24

Areas are in hectares. In Cuba, land is usually measured in caballerías (1 ha = 0.0745 caballería; 13.42 ha = 1 caballería).
Source: Departamentos de Control Estadístico del MINAZ y del MINAGRI de Villa Clara, Cienfuegos y Sancti Spiritus

Table 4. Approximate fuel saving as a result of animal traction in the central region of Cuba

Province	*Fuel savings by activity*			
	Soil preparation (tonnes of fuel)	*Sowing and crop care (tonnes of fuel)*	*Transport (tonnes of fuel)*	*Total (tonnes of fuel)*
Villa Clara	**1186**	**1436**	**439**	**3061**
Sancti Spiritus	**272**	**1021**	**1067**	**2360**
Cienfuegos	**457**	**915**	**628**	**2000**
Total	**1915**	**3372**	**2134**	**7421**

Note: Diesel substitution is calculated as an approximate equivalent to the fuel used by a tractor to perform a comparable operation. Totals are calculated using the following data as an index: Plowing 28 litres ha^{-1} (371 litres $caballería^{-1}$), Harrowing 10 litres ha^{-1} (133.2 liters $caballería^{-1}$) Transport 3.5 litres $hour^{-1}$
Source: Departamento de Estadísticas MINAGRI, La Habana, Cuba

Taking a conservative estimate of the price of diesel fuel of $US 200 per tonne, the 7421 tonnes saved through the use of animal traction instead of tractors, represented a saving of $US 1.5 million in fuel costs in the central region of Cuba in 1999.

Blacksmiths are very important for animal traction. They make shoes for horses, and also for oxen that used mainly for transport. They also have a very important role in repairing equipment, notably shares, mouldboards and making simple metal equipment. The numbers of working blacksmiths in the region is given in Table 5, which suggests that there is a shortage of blacksmiths. There is a shortage of coal for blacksmith forges. In the small farms and cooperatives there are few animals, and it would not be justified to pay a full-time blacksmith. Therefore, one farmer often works as a part-time blacksmith, taking on such work when required.

Table 5. Numbers of blacksmiths in the central region

Provinces	*Actual numbers*		*Numbers required*	
	Blacksmith shops	*Blacksmiths*	*Blacksmith shops*	*Blacksmiths*
Villa Clara	177	197	235	235
Sancti Spiritus	187	167	232	232
Cienfuegos	66	61	116	116
Total	**432**	**425**	**583**	**583**

Source: Torres, León y García, 1998; MINAZ, 1999

There is a shortage of appropriate animal traction implements in the region. In almost all interviews with farmers in all sectors, people complained about the lack of available implements and the lack of materials to make or repair implements. Table 6 gives the number of implements in the region, and the ratio of implements to pairs of oxen. This ratio is low, confirming the need for more animal traction implements on farms.

Table 6. Numbers of animal drawn farm implements in the central region

Province	*Ministry*	*Numbers*	*Requirement*	*Ratio Implement:Yunta*
Villa Clara	MINAZ	9000	15400	1.3
	MINAGRI	30577	31220	2.3
Sancti Spiritus	MINAZ	2687	5000	1.7
	MINAGRI	26207	27400	3.3
Cienfuegos	MINAZ	4124	7500	2.1
	MINAGRI	3101	4000	2.1
Total		**75696**	**90520**	**2.2**

Source: Source: Torres, León y García, 1998; MINAZ, 1999

Conclusions

Animal traction continues to be a necessity in Cuba. The fuel savings are of vital importance at a time of high fuel prices, but animal traction is also an important ingredient in achieving a sustainable agriculture. The central region of Cuba occupies has the highest use of work animals in the country, with 547 000 ha, or 25% of the cultivated land, tilled using oxen.

Animal traction should be developed and promoted further. It is likely to increase in State enterprises in the coming years. One constraint may be the age and status of the ox handlers or *boyeros*. These are mainly old men, with much experience, but on the point of retirement. Young people are not very attracted to this work, which involves looking after the animals every day, even if they are not working. To assure the future of the *boyero* movement in the region and the country, it is necessary to

transfer knowledge and experience to a new generation. This process is happening, slowly but a systematic, widespread, training campaign is also needed.

The key point at the heart of animal traction activities is the lack of resources. Resources are needed for implement production and sale, veterinary products, adaptive research and training. There is also a problem of animal security. These problems all need to be addressed in order to increase the use of animals as an energy source in our agriculture.

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This paper was prepared as part of a national animal traction research programme supported by the British Department for International Development (DFID) and coordinated by the Instituto de Investigaciones de Mecanización Agropecuaria (IIMA). For further information see the website: http://www.recta.org
The paper was translated by Brian Sims, Silsoe Research Institute, Wrest Park, Silsoe, Bedford MK45 4HS, UK
It was edited by Paul Starkey, Animal Traction Development, Oxgate, 64 Northcourt Avenue, Reading RG2 7HQ, UK