

## Equines in rural transport in Güinope, Honduras

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**Abstract.** Rural transport in Honduras is a vital part of the development process. This study of transport options and needs in the Güinope district of El Paraíso Department highlights the role of equines (donkeys, mules and horses) and describes their various capacities, uses and equipment. Economic analysis of the costs of equine transport indicates values of US\$0.02-0.04 per 50 kg load per kilometer, compared with a charge rate of US\$0.06.

**Key words:** donkeys, mules and horses; economic analysis

**Resumen.** El transporte rural en Honduras forma parte vital del proceso de desarrollo. Este estudio de las opciones y necesidades de transporte en el distrito de Güinope (Departamento de El Paraíso) pone énfasis en el papel de equinos (burros, mulas y caballos) y describe sus varias capacidades, usos y equipos. Un análisis económico indica valores de US\$0.02-0.04 por kilómetro por carga de 50 kg; comparado con una tasa de cobro de US\$0.06.

**Palabras claves:** burros, mulas y caballos; análisis económico

### INTRODUCCION

Silsoe Research Institute (SRI) is involved in a programme of on-farm research in the hill district of Güinope, El Paraíso Department, Honduras (Figure 1). During 1994, SRI participated in a rural transport study being undertaken by Cranfield University and funded by the Overseas Development Administration of the UK government. The aim of the study was to identify key aspects of the rural transport situation in order to propose policy priorities to the Honduran government (Ellis-Jones and Sims, 1995).

The transport situation was appraised by means of informal interviews with suppliers and demanders of transport, and backed up with more formal questionnaires. In terms of numbers of users, the use of equines is the most common form of local transport and, as the rugged terrain often precludes the widespread use of carts, loads are most frequently carried on the animals' backs. Given this situation, the investigation was extended to include saddle and pack-makers, farriers and others involved in the supply and use of equines for transport.

### THE GÜINOPE AREA

Güinope is typical of much of Honduras being mountainous, with many summits rising to over 1800 metres above sea level and characterized by forestry and agriculture on steep slopes. It is estimated that some 65% of the area is forest dominated by pines, 30% is devoted to agriculture with the balance being villages, roads and rivers. The climate is characterised by an annual rainfall of 1100-1300 mm and, although rain falls in all months, the rainy-season is from May to October. Rain is a major factor contributing to road deterioration and can cause road closures due to land-slips and severe rutting at any time during the rainy months.

Farm sizes tend to be small with 60% having an average size of three manzanas (1 manzana = 0.7 hectare). The main crops grown are: basic grains (maize and beans); vegetable cash crops (cabbages, potatoes, onions, garlic, chillies, tomatoes); fruit crops (principally oranges, also strawberries, mango, papaya, avocado, bananas); coffee; sugar cane. Maize and beans are grown by all farmers, the first priority being for self-sufficiency with surpluses being marketed.

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Güinope is connected to the asphalt road (which leads to the Honduran capital, Tegucigalpa) by 27 km of all-weather unpaved road. All other roads in the municipality are unpaved and poorly maintained, capable of taking motor traffic but deteriorating badly in the wet season and often becoming impassable for short periods (Figure 2).

### DEMAND FOR RURAL TRANSPORT

Rural transport needs derive from several sectors of the economy, principally: agriculture; forestry; retail trade; construction; personal and household needs.

Agricultural inputs (eg: fertiliser; agro-chemicals; seed; implements) are bought in towns (Tegucigalpa and Güinope) and have to be transported to the farmstead, whereas agricultural produce is transported from field to the farmstead and then surpluses are taken to markets. Markets may be local, around neighbouring hamlets, or more distant in Güinope or Tegucigalpa.

Exploitation of the indigenous pine forest is a major source of income in the area and requires transport for marketing the products. The principal need is for hauling

tree trunks extracted from the forest to the Güinope saw mill and to truck the prepared lumber to market. Additional needs are to transport extracted pine resin to local collecting points from where larger loads are taken to Tegucigalpa. Firewood is not only required for local household cooking purposes but is also carried to Tegucigalpa for sale (Figure 3). The forest is exploited locally for the supply of building and fencing materials and for the manufacture of ploughs, animal drawn carts and wheelbarrows.

Retail grocery distribution (through small shops called *pulperías*) is an important economic activity that requires constant transport of stock from, mainly, Tegucigalpa. House construction materials (*adobe* blocks, roofing tiles) are usually locally made and are transported over short distances. Cement, steel, plumbing and electrical supplies (when needed, which is not always in the more humble abodes) are brought from Tegucigalpa.

Finally the rural population needs to travel for a wide variety of reasons (education, religion, health, social, household supplies) and this can call for local or longer distance travel.



Figure 1. The location of Güinope, El Paraíso Department, Honduras, Central America.



Figure 2. Farm produce (maize and beans) being transported by horse, donkey and farmer. The animals' loads are typically two *quintales* (100 kg) which donkeys can sustain for short distances.

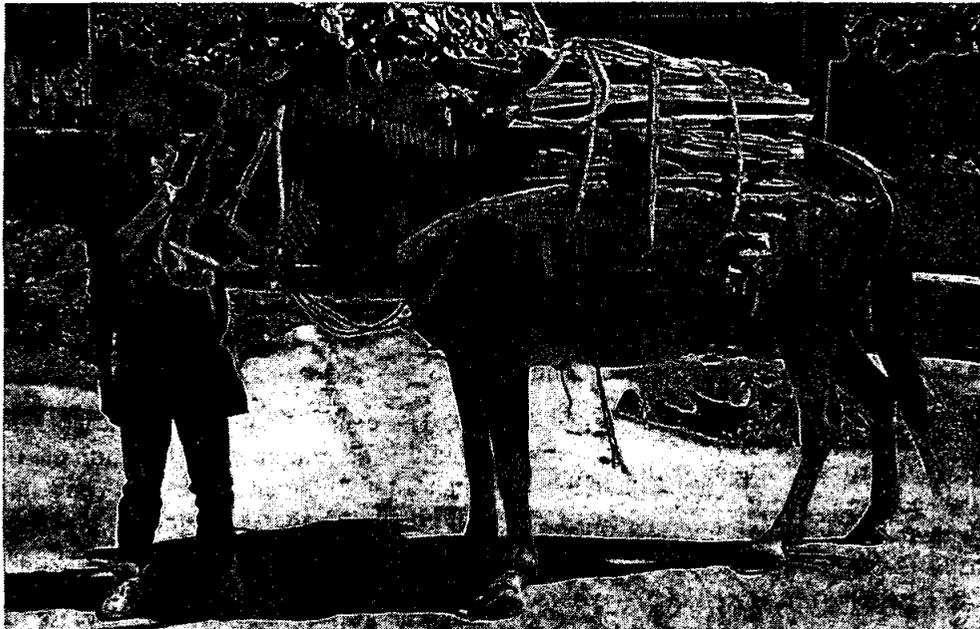


Figure 3. Horse use for transporting firewood. The load is supported by wooden hooks (*angarillas*) tied to the *carguero*.

## EQUINES FOR TRANSPORT

Human, animal and motorised transport is available in the region and all are commonly encountered. Men, women and children all carry large loads (of firewood, agricultural inputs and produce, household and retail goods), along tracks to bus stops or to and from their fields. Distances are generally not greater than 2-3 km. To make human powered transport less arduous, wheelbarrows and bicycles are used on smoother paths.

The most important mode of transport on transitable roads (in terms of tonnage carried) is motorised, comprising: trucks; buses; cars; and motor-cycles. However by far the most common form of conveyance (of goods and people) away from the main thoroughfares is equines (donkeys, mules and horses). Donkeys are not usually used for riding, but mules and horses are and are often a source of pride for their (predominantly male) owners.

### i) Populations

Of a total equine population of 341 k, 250 k are horses, 69 k are mules and 22 k are donkeys (Dr. Marco Antonio Esnaola, EAP, personal communication). Mules constitute the most desirable transport animals, but all types have their niche.

### ii) Desirable characteristics

Given the choice, farmers would select animals which have: good stamina; high load-carrying capacity; low maintenance and care requirement and low requirement for high value feed. Consequently the natural choice would be mules, which is why they are the most expensive.

### iii) Body-weight and load-carrying capacity

Typical body-weights and load carrying capacities vary for equines (Table 1). Horses and mules carry *cargas* of two 100 lb *quintales* (ie approximately 100 kg). Whereas donkeys may be able to carry a *carga* over short distances, they usually have lighter loads. Honduran local (*criollo*) horses are known as *aguacateros* and are usually lighter and have less stamina than mules.

**Table 1.** Body-weights and load-carrying capacities for equines

Equine	Body-weight (kg)	Load carrying capacity (kg)
Horses	200-350	80-100
Mules	220-300	100
Donkeys	150-220	50-60

### iv) Speed and distance covered per day

Pack animals, if left alone, will adopt a steady walking pace which can only be greatly exceeded for short bursts. Farmers comment that horses and mules are more content to maintain a steady forward speed, whereas donkeys often require 'encouragement'. Table 2 gives ranges for walking speeds, length of working day and distance covered with a full load.

**Table 2.** Speed, working day and distance covered by working equines

Equine	Walking speed (km h <sup>-1</sup> )	Length of working (day hour)	Distance covered, (km day <sup>-1</sup> )
Horse	5-6	5-6	15-20
Mule	5-6	7-8	25-35
Donkey	3-4	5-6	10-15

### v) Costs and useful life

The costs of equines are variable depending on age, health and training of the animals, Table 3 gives an indication of the range of values encountered. Two years old is too young for equines to start work. Three to four years old would be preferable as the skeleton would be fully formed and more muscle would have been put on. Campbell (1990) suggests 2-3 years for horses and 3-4 years for mules. CEEMAT/FAO (1972) suggests three years for horses. The cost of mules is very variable. Average figures are given in table 3, but exceptional animals may cost up to US\$300.

**Table 3.** Honduras: Equine costs, useful life and age at start of work.

Equine	Capital cost (US\$)	Useful life (year) <sup>a</sup>	Age at start of work (year)
Horse	70 - 130	14 - 15	2
Mule	110 - 170	20 - 25	2
Donkey	20 - 45	20 - 25	2

<sup>a</sup> Campbell (1990) reports that mules can live up to 70 years but are at their peak capacity from 6-10 years old.

#### vi) Pack-saddles and shoes

**Pack-saddles.** The pack carrying arrangement on the animals' back (Figure 4) comprises several components. A jute sack (*bramante* or *mantillo*) is placed over the back.

On top of the of the *mantillo* are three component parts made from banana leaf veins (or rice straw if this material is not available): i) the *esterilla* or *aliño* is a mat over the *mantillo*; ii) the cylindrical *lomillos* on each side to protect the spine, these are tied to the *esterilla*; iii) the *albardón* is a second mat which covers the structure so far. The load-carrier (*carguero* or *aparejo*) is made of cow-hide and wood which is secured by one or two webbing cinch belts (*cinchas*) around the animal's belly and a leather tail strap (*tenedora* or *grupa*). Loads can be tied directly to the *carguero* or carried in a pair of cow-hide panniers (*árganas*) can be slung across. Fire-wood is secured by one or two pairs of wooden hooks (*angarilla*) tied to the *carguero*. Pack animals do not use bridles and bits, a piece of rope will normally suffice. Prices for the various components are shown in Table 4.



**Figure 4.** Pack-saddle construction. The *carguero* or *aparejo* is placed over the *albardón* and secured with a cinch strap. Wooden *angarillas* may be used to facilitate firewood transport.

**Table 4.** Prices of pack-saddle components

Component	Cost US\$
<i>Bramante</i> or mantillo	1
<i>Esterilla</i>	2
<i>Lomillos</i> (2)	2
Albardón	2
<i>Carguero</i> or aparejo	10
<i>Cincha</i>	2
<i>Arganas</i> (2)	20
<i>Angarillas</i>	2
<b>Total</b>	<b>41</b>

According to Pedro Flores, saddle maker of Lizapa, Güinope, poor quality and fit of the saddle is the major cause of back lesions. He is able, with the help of an assistant, to make two complete saddles per week. However there is generally little investment in equipment as owners consider that 'animals will work the same' if money is invested or not.

**Shoes.** The use of shoes varies, but is rare and is dependent on the hardness of the terrain to be encountered. A set of four mild steel shoes will cost from US\$4-7, which includes the shoes, nails and labour. *Campesinos* (like everybody else) want to see value for money and so will leave them on for several months, this means that the hooves cannot be trimmed regularly and can lead to overgrown hooves and walking difficulties.

#### vii) Carts

Cart use by equines is uncommon and is restricted to the best maintained roads. However two-wheeled horse-carts are to be found in the area. The axles are usually salvaged from motor vehicles and pneumatic tyres are used. The locally made bodies usually have a welded frame with a steel or wooden body. Capacity is about 10 *quintales* (450 kg) and the cost about US\$150. The twin shafts of the cart are tied to the *carguero*, a simple breast band harness is used to apply the pulling force, and a breeching strap may be used to absorb the forward thrust of the cart on down-grades.

#### vii) Feeding and health

Donkeys used for transport need to be hardy as the

quality of the feed that they receive will usually depend on the grazing available, supplements are not provided. Animals are tethered to graze, often on road-sides or common land. Horses and mules fare a little better with some owners cutting and carrying irrigated grass (commonly *Pennisetum* spp.) in the dry season. The rule of thumb is that equines can eat 10 per cent of their body weight in fodder each day, but generally the feed is of poor quality and growth rates are low.

Internal parasites are the main health problem, although animals are rarely, if ever, treated. Lesions in the back region, caused by ill-fitting saddles, are the most common ailment. Veterinary costs are practically zero.

#### Costs of animal-powered transport

With the aim of putting a price on equine transport of goods, the information on prices, working times, loads, distances, has been summarised in Table 5.

**Table 5.** Costs of equines and associated equipment, US\$

Cost	Horse	Mule	Donkey
Purchase price <sup>a</sup>	100	140 <sup>b</sup>	33
Sale price <sup>c</sup>	0	0	0
Working life <sup>a</sup> , yr	15	23	23
Days worked per year (estimate)	100	100	100
Hours worked per day <sup>d</sup>	5.5	7.5	5.5
Total hours worked per year	550	750	550
Distance travelled per year <sup>e</sup> , km	1750	3000	1250
Distance travelled per year loaded	875	1500	625
Pack-saddle cost <sup>f</sup>	41	41	41

<sup>a</sup> Average values from Table 3.

<sup>b</sup> See footnote 1, Table 3.

<sup>c</sup> At the end of their working lives equines are not sold. There is a slaughter house in San Pedro Sula which pays US\$10 per animal, the meat is then fed to crocodiles. No such market exists for Güinope.

<sup>d</sup> Average values from Table 2.

<sup>e</sup> Assuming that pack animals only carry pay-loads in one direction. This is not always the case and is clearly not desirable from the owners point of view.

<sup>f</sup> From Table 4.

Using standard economic analysis, the annual costs of operating working equines have been calculated and shown in Table 6. Table 6 also gives the costs per hour, per kilometer and the cost per km per 50 kg load (1 quintal).

**Table 6.** Calculation of annual transport costs, US\$

Cost	Horse	Mule	Donkey
Depreciation <sup>a</sup> :			
i) Animal	6.7	6.1	1.4
ii) Pack-saddle (20% of cost per year)	8.2	8.2	8.2
Repair and maintenance of equip- ment (10% of cost per year)	4.1	4.1	4.1
Interest on capital <sup>b</sup>	14.1	18.1	7.4
Veterinary costs <sup>c</sup>	10.0	3.0	2.0
Feed supplementation <sup>d</sup>	10.0	5.0	2.0
<b>TOTAL ANNUAL COSTS</b>	<b>53.1</b>	<b>44.5</b>	<b>25.1</b>
Cost per hour	0.10	0.06	0.05
Cost per km loaded	0.06	0.03	0.04
Cost per 50 kg load per km <sup>e</sup>	0.03	0.02	0.04

<sup>a</sup> Annual depreciation =  $\frac{\text{Purchase price} - \text{sale price}}{\text{working life}}$

<sup>b</sup> Annual interest =  $\frac{\text{Purchase price} + \text{sale price}}{2} \times i\%$

<sup>c</sup> Veterinary costs are near to zero and are sporadic.

<sup>d</sup> Some supplements are given (eg corn, grass) and these will have opportunity labour costs.

<sup>e</sup> Average loads carried are from Table 1.

Table 6 shows that the costs per 50 kg per km are low in all cases, with mules being the most economical followed by horses and donkeys. No labour charges have been included, either for driving the pack animals or for their care and feeding.

#### Prices charged for animal powered transport

Whilst the norm for producers is to own their transport

animals and so not incur any out of pocket expenditure for their use, there does exist a rental market. The horses, mules and donkeys per days (5 km approximately) is US\$ 0.56 (US\$ 0.06 for 50 kg<sup>-1</sup> km<sup>-1</sup>) hire costs in the villages around Güinope.

The hire charges are approximately twice the costs of transport. Table 6 gives costs of US\$0.03, 0.02 and 0.04 per 50 kg load per km for horses, mules and donkeys respectively (US\$0.03 average). This compares with a charge rate of \$US0.06 for all classes of animal.

#### CONCLUSION

The provision of transport has evolved in the Güinope Municipality according to needs and possibilities. Where conditions permit (all-weather roads) motorised transport and animal-drawn carts with their increased load-carrying capacity are viable. Where conditions are bad, either permanently or seasonally, pack animals or human power are used. Prices are low, indicating abundant supply, and it would be safe to assume that the transport needs of the population are well served by present arrangements.

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