

# The use of donkeys for transport in Amhara Region, Ethiopia

by

**Geta Kidanmariam**

*Amhara Regional Bureau for Agriculture, Combolcha Rural Technology Promotion Centre  
PO Box 146, Combolcha, Welo, Ethiopia*

## Abstract

*In Amhara Region there are an estimated 1,046,700 equids of which 659,200 are donkeys. Donkeys are widely used as pack animals. They are very reliable and require minimum supervision and management and little food, mostly grazing. In some parts of the region the use of donkeys for pulling carts has become increasingly popular in recent years, especially in North Welo, Kobo, and Shewa Kewet. The use of donkeys for pulling carts not only enables larger quantities of goods to be transported but also allows users to earn extra income through hiring them out. This paper examines experiences with donkeys in transport operations in Amhara Region.*

## Introduction

In Amhara Region 90% of travel in rural areas involves transport of goods and is mainly done by pack animals, by head and/or back carrying. Transport is a difficult issue for rural people. A major problem is the maintenance of the road system. In recent times animal-drawn carts (donkeys, horses or oxen) have been demonstrated and adopted in some parts of the region where there are well maintained roads and flat areas on

which carts can be easily pulled. Animal-drawn carts have ten times the load carrying capacity of pack animals. The crucial problems in adopting these carts are: their high cost compared to rural incomes; the lack of credit facilities to support their purchase; cultural factors; and poor road maintenance. In addition, the quality and performance of the carts limit their adoption. The two Rural Technology Promotion Centres (RTPCs) at Bahir Dar and Combolcha have been trying to adapt, improve and demonstrate the multipurpose animal drawn cart with some success.

The estimated numbers of equids in Amhara region are shown in Table 1.

## Donkey-drawn carts in Amhara region

Some farmers living on good roads are using donkey-drawn carts for transporting construction materials such as sand, gravel and stone and for transporting their produce from the field to their homes and to the market. Straw and firewood are also transported from the fields to their homes. In some areas blacksmiths are now manufacturing local donkey carts from available scrap material. Table 2 shows a comparison of the local donkey cart and the new multipurpose cart.

### Local donkey cart

#### Advantages

- lower cost compared to multipurpose cart (around 30–35%)
- can be made using local skills and materials (except scrap axle and bearing assembly)
- can be maintained locally.

#### Disadvantages

- limited supply of scrap axles and bearings
- have weak parts
- poor availability and lack of standardisation of spare parts
- difficult to load and unload.

**Table 1: Estimated numbers of equids (1000s) in Amhara Region in 1990**

Zone	Horses	Mules	Donkeys
East Gojam	33.2	1.8	92.3
West Gojam	88.4	4.5	91.1
North Gender	2.7	1.8	56.1
South Gender	29.1	9.1	50.2
North Shewa	28.5	4.2	103.9
North Welo <sup>1</sup>	49.6	12.1	74.0
South Welo <sup>2</sup>	90.5	32.0	191.3
<b>Total</b>	<b>322.0</b>	<b>65.5</b>	<b>658.9</b>

Source: Statistics, 1990.

<sup>1</sup>Waghamra zone is included in North Welo zone

<sup>2</sup>Oromyia zone is included in South Welo zone

**Multipurpose animal-drawn cart***Advantages*

- cart quality and strength of parts is better than of local carts
- easier to load and unload
- can use with different types and sizes of animals (ox, horse, mule and donkey)
- consistent materials and components for cart easy to maintain.

*Disadvantages*

- expensive compared to local donkey cart
- needs skill and machinery to manufacture.

*Design and manufacture*

The two-wheeled multipurpose animal-drawn cart was designed in the RTPC (see Photo 1). A hollow steel shaft is used for the axle with pneumatic tyres and roller bearings. Angle iron is used for the framework with sheet metal and/or wood for strengthening. The sides are made from local timber. All these raw materials required for manufacturing the carts are generally available.

*Frame and body*

The size of the cart body should be compatible with its capacity. Making the body too large is wasteful in terms of increasing the cost and the dead-weight of the cart. It also encourages overloading. The width, height and length of the carts should be within a range of dimensions according to the draft animal to be used. For example, when using a single donkey the range should be 1.0–1.2 m wide and 1.4–1.6 m long. For an ox the range should be 1.0–1.3 m wide and 1.8–2.2 m long. For a multipurpose cart capable of being drawn by any species, donkey, ox, horse or

mule, the dimensions should be 1.1 m wide and 1.6 m long.

The left and right sides of the frame are made from angle iron and the other parts of the frame from square pipe which minimises the weight of the cart. The platform of the cart is made from sheet metal or wood according to the farmer's needs. The sheet metal platform is more durable than a wooden platform although the costs at current prices are almost equal.

*Axle and wheel*

For manufacturing multipurpose animal-drawn carts axles and bearings are imported with full assembly. The two pneumatic tyres are size 7.50 x 16. For sustainable production of carts most parts should be manufactured in RTPCs. An attempt was therefore made to design an axle from round bar with a diameter of 40 mm and from a three inch hollow shaft. The bearing, housing and rim are manufactured and suitable ball bearing selected according to the load carrying capacity. This new axle and wheel assembly are currently on trial.

*Suspension*

The suspension is connected to the platform and axle by bolts. It is made from angle iron which can safely carry the expected load.

*Drawpoles and harness*

The two drawpoles or shafts are made of wood. Careful selection of the material and preparation of the drawpoles is essential for the comfort of the animals. With donkeys, most farmers use local saddles. The attachment of the drawpoles and harness is illustrated in Photo 1.

**Table 2: Comparison of local donkey cart and multipurpose animal-drawn cart with donkey**

<i>Parameter</i>	<i>Local donkey cart</i>	<i>multipurpose animal-drawn cart</i>
Capacity	1.5–3 quintal	3–5 quintal
Overall size–width x height x length (m)	1.5 x 0.6 x 2.5	1.1 x 1.06 x 1.6
Total cost (purchasing)	Birr 700 (US\$ 110)	Birr 1144 (US\$ 180)
Strength of parts	easily broken	stronger
Complexity of manufacturing	simple	more complex
Comfort for donkey	uncomfortable	comfortable
Comfort for loading and unloading	uncomfortable	comfortable

### Profitability analysis

To determine the profitability of the carts a study was carried out in North Welo zone, Kobo area, and Oromiya zone, Kemisie area. Owners obtained income by hiring out their carts but the amount of income differed from season to season. To determine the annual profit of a cart owner the data in Table 3 was considered.

Net income (profit) per year is around Birr 2700 (US\$ 430). This amount of money per farmer shows that the donkey cart is one of the most important farm implements in income-generating activities.

### Farmer suggestions and comments

Most farmers who live on maintained roads appreciate the advantages of the cart. Some farmers commented that the carts should be made and maintained locally, the parts of the cart should be durable, and the carts should be light in weight. The farmers also suggested that credit facilities should be available.

**Table 3: Profitability analysis of the multipurpose animal-drawn cart**

<i>Item</i>	<i>Cost</i>
Purchase cost of cart	1144 Birr
Purchase cost for donkey	240 Birr
Annual depreciation (cart)	228 Birr/year
Annual cart maintenance cost	180 Birr/year
Annual depreciation (donkey)	48 Birr/year
Annual feeding cost (average)	730 Birr/year
Total annual labour cost	450 Birr/year
Risk and maintenance cost	180 Birr/year
<b>Total annual costs</b>	<b>1816 Birr/year</b>
Total working days in a year	150 days
Average daily hire income	30 Birr
<b>Total annual income</b>	<b>4500 Birr/year</b>
<b>Net annual income (profit)</b>	<b>2684 Birr/year</b>

*Note: US\$ 1 ≈ Birr 6.3*

*Photo 1: Transporting produce to market using the multipurpose donkey cart in North Shewa, Ethiopia*



Photo: Geta Kidanmariam

### **Constraints to adoption**

Constraints to the adoption of multipurpose animal-drawn carts are as follows:

lack of co-ordination between government and non-government organisations involved in development, manufacture, distribution and promotion

limited purchasing power of farmers

structural problems between Rural Technology Promotion Centres and agricultural extension officers

shortage of transport to distribute and promote

lack of maintained roads

lack of technical skills.

### ***Suggested solutions***

From the perspective of the Rural Technology Promotion Centres, the following actions are suggested to speed up adoption.

government organisations and NGOs involved in development, manufacture, distribution and promotion should co-operate and collaborate credit should be facilitated

linkages between RTPC and agricultural officers should be arranged

transport to promote and distribute carts should be facilitated

priority should be given for road maintenance and improvement especially in rural areas

adequate training should be given to farmers and extension staff.

### **Conclusions**

In Amhara region there is plenty of animal power which is not yet properly utilised. Manufacturing, demonstrating and adapting the RTPC donkey-cart is a part of the solution to transport problems in the rural areas.

### **Reference**

Statistics, 1990. Ethiopian Statistical Abstract 1990. Central Statistics Office, Government of Ethiopia, Addis Ababa, Ethiopia.