IMPORTANCE OF
CAMEL IN DESERT ECOSYSTEM
IN RELATION TO CART TRANSPORTATION
AND AGRICULTURAL OPERATIONS

CAMEL DRAWN 5-TYNE CULTIVATOR

CAMEL DRAWN BUND FORMER

NATIONAL RESEARCH CENTRE ON CAMEL
JORBEER, SHIVBARI
BIKANER - 334 001 (RAJASTHAN)
IMPORTANCE OF CAMEL IN DESERT ECOSYSTEM IN RELATION TO CART TRANSPORTATION AND AGRICULTURAL OPERATIONS

Authors:
Dr. Aminudeen
Dr. M.S. Sahani
Dr. F.C. Tuteja
Shri Nand Kishore
Smt. Mamta Goyal

National Research Centre on Camel
Jorbeer, Shivbari
Bikaner-334 001 (Rajasthan)
Published by:
Dr. M.S. Sahani
Director
National Research Centre on Camel
Bikaner-334001 (Rajasthan)

Published:
November-2003

Printed by:
R.G. Associates
Bikaner
Tel. : 0151-2527323
IMPORTANCE OF CAMEL IN DESERT ECOSYSTEM IN RELATION TO CART TRANSPORTATION AND AGRICULTURAL OPERATIONS

INTRODUCTION

Some of the typical characteristics of camel has made it an important animal of the desert. It can survive without water for weeks. Its large body has an advantage that it takes long latent period for the core to heat up when exposed to solar radiation. Moreover, the underparts remain in the shade created by the body, heat can be dissipated by radiation to the soil. The core is therefore virtually unaffected for most of the day. The fat layer below the skin is too thin to enable heat to dissipate in the environment. Apart from that thick and hard skin pad at thorax and limbs, hump, thick lips, hairs on nostrils, third membrane of eyes, thick hair on face are some of the important adaptations for this animal for dissipation of heat, protection from thorns of bushes, sand particles, strong sunlight and storage of food. The bones of palm of the limb are flat, broad and remain embedded in padded skin. The padded palm expands due to pressure exerted as it walks and makes a strong hold in sandy soil. In this way camel can easily trot through a sandy desert tract. Camel has more pulling power than any other animal. In desert, the camel has been used as source of power. Because of its extraordinary ability to transport load in desert sandy tract and pull agricultural implements in hot arid atmospheric conditions without consuming water, it is called the ship of the desert.

COMPARISON OF INCOME EXPENDITURE RATIO BETWEEN CAMEL V/s OTHER ANIMAL CARTS

Income: Expenditure ratio of camel cart (0.96) has been adjudged to be superior than donkey (0.92), bullock (0.71).
mule (0.67) and horse (0.49) carts. According to a survey one can earn Rs. 2-5 thousand per month by operating a camel cart.

**USE OF CAMEL**

Camel has been traditionally used in following 4 ways

1. As a pack animal
2. Pulling camel cart and
3. Pulling agricultural implements
4. For riding purposes

**TRAINING OF CAMEL FOR WORK**

1. **RIDING**

The training of a camel is initiated at about three years of age, after putting nose peg. The nose peg is generally made of wood about 5-6 cm long, 3-4 cm in diameter at the base. The nose peg is fixed after piercing both nostrils.

A rope made of cotton 4-5 m long is attached to the nose peg with the help of a thin cotton string. The animal is led by a person to teach it to walk in a straight line and to acquaint it with the words of command, to kneel down, sit and stand. The commands are given firmly with jerking on the control rope. The animal is made to follow the commands again and again until they are obeyed instantaneously. Once the camel becomes used to riding, the training is given it for loading and/or for draught.

2. **CART PULLING**

The camel is hitched to a cart without a load. One person stands on the cart and two people walk in front of the cart keeping the ropes in their hand and pull it gently so that the camel is encouraged to move ahead. Once the camel
becomes used to carting, the cart is loaded initially with 2-4 quintal weight. The weight on the cart is gradually increased as the animal gains in experience. Normally it takes about 2-3 weeks to train a camel for carting.

3. PLOUGHING

A camel trained for riding can easily be trained for ploughing. The camel is put to ploughing with the necessary implements and harness. Initially, one man moves leading the camel at a walk in a straight line and the other holds the handle of the plough. The camel may take about 1-2 weeks to learn ploughing. However, a camel already trained for other work takes less time than an untrained one. One man can perform the work of ploughing after the animal is well trained.

PACK ANIMAL

After putting loads of 50, 100, 150 and 200 kgs on back of the camel, it was observed that camel can travel with these loads at a stretch for 5, 4, 3.5 and 3 hours, respectively. With this load camel can travel at a speed of 2-4 km per hour. After resting for a suitable period, camel can be again used. A good camel can carry a load equal to 400 kg for short distances.

PULLING CAMEL CART

It has been observed that camel can easily pull load equal to 2.5 - 2.8 times of their body weight in a camel cart. Camels with average body weight 5-6 quintals can pull load equal to 12-18 quintals and travel upto 20 kms in 4 hours.
After suitably resting for 4 hours, camel can be reused for another 4 hours on same day. It has been observed that camels feel no difficulties in pulling a 2 wheel cart bearing load equal to 15 quintals. Putting more load on a camel cart, camel cannot pull for more than 3 hours.

It has been observed that 2 wheel carts with pneumatic tyres are more suitable for kaccha roads and sandy tracts while jeep tyres are preferred for metallic roads. Using a hydrolic dynamometer, pulling load was adjudged to be 90-120 kg for a cart carrying 12-18 kg load. This was equal to 17-22% of camel body weight. It was also observed that a camel, while pulling a cart carrying load equivalent to 18 quintals has to generate load equivalent to 120 kg on kaccha road and 81 kg on metallic road. It can be thus expected that a camel can pull more loads on metallic roads as compared to sandy tract. Vyas and Verma (2002) have reported that a camel can generate force equivalent to 20% of its body weight but for routine it is advisable to use load which require pulling force equal to 16-18% of their body weight.
It has been observed that camels can carry load equivalent to 2.8 times of their body weight and can cover a distance up to 25.5 km in a four wheel cart. Using four wheel camel cart and load equivalent to 2.5 times of their body weight camels can travel up to 11-12 km in 3 hours. After a suitable rest, similar sort of travelling can be accomplished on same day. In summer season, when the temperature in dry arid climate reaches to 42-46°C, transportation work is accomplished during cooler hours, early morning and evening. The camels are being rested in hot noon hours under tree shadow. Harness used in camel also affects the efficiency of pulling. Rewari type of camel harness has been adjudged to be superior over Bikaner and Udaipur type. The draught force generated with Rewari type of harness measured 18-20% as compared to 10-12% with Bikaneri type.

CAMEL RIDING

Camel can cover 30-40 km daily in riding. A good camel can cover even 70 km distance. An adult camel used for transport work can consume 14 kg of dry fodder and 2 kg of concentrate ration.
UTILITY OF CAMEL IN AGRICULTURAL OPERATIONS

Survey work among farmers has revealed that now a days majority of farmers are using tractors for agricultural operations on their land. Even than they have to use camel for ploughing some of the portion of their land, which cannot be covered by tractor viz.- sand dune land. Apart from that if sand storm comes and one need to replough, the camels are used for that purpose. Some of the farmers exclusively use camels for agricultural operations. Single and double ploughs are being used in large. Sowing of groundnut requires both tractor as well as camel. Initially tractor is used for pulverizing the soil, which is then sown with camel. A camel can plough 3-4 beegha land in a day. Putting more labour, it can be possible to cover even 6 beegha of land. In groundnut sowing on a land previously pulverized with tractor, camel can cover only 1-1.5 beegha in a day.

Comparison of agricultural operations between camel and tractor

<table>
<thead>
<tr>
<th>Tractor</th>
<th>Camel</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work is performed at much fast rate.</td>
<td>Work is performed at slower rate.</td>
</tr>
<tr>
<td>2. Depth of seeding accomplished is somewhat less.</td>
<td>Depth of seeding accomplished is slightly more.</td>
</tr>
<tr>
<td>3. Seeds get relatively less moisture.</td>
<td>Seeds get relatively more moisture.</td>
</tr>
<tr>
<td>4. Natural vegetation, grasses and bushes are being damaged with continuous use of tractor</td>
<td>Natural vegetation, grasses and bushes are not being damaged and helps providing fodder</td>
</tr>
</tbody>
</table>
& also affects soil fertility. resource during lean period and

droughts in addition to soil

fertility.

5. Seed requirement is higher. Seed requirement is low.

6. Labour cost is low. Labour cost is high.

7. Cut less no. of rows. Cuts more no. of rows.

Despite being certain advantageous over tractor, the
camel is not being used for agricultural operations as much as
it should be. The possible reasons are.

1. Lack of technical know how about camel's power among

armer.

2. Lack of suitably designed camel drawn agricultural

implements.

3. Lack of irrigation facilities in desert.

Currently deshi plough and patella etc being used in
arid zone. Vyas and Verma (2002) were of the view that animal
drawn seed drill, harrow, cultivator and similar other
agricultural implements can be operated with camel which
would be useful as natural grasses and vegetation remains
unharmed by camel drawn implements.

It has been observed that a camel can plough
continuously for 4.25 hours and can plough 3136m² area. The
ploughed area per hours measured 740.6 m². The depth of
ploughed land measured 9-15 cm. The angle of the plough
used was 21°. Camel generated a draught force of 9.24 -
16.91 % of their body weight. The energy generated measured
1.10 horsepower. The ploughing capacity was adjudged to
be 523.28 m² per 100 kg. body weight.
Using double plough, camels were observed to pull it continuously for 4 hours covering a land equal to 4000 m². After being rested in noon hours, it is possible to use them for another 4 hours in evening.

Using harrow, camels were observed to pull it continuously for 1 hour covering a land equal to 2000 m².

Five tyne cultivator cannot be pulled by a camel continuously for 1 hour. It appears that both harrow and cultivator are heavier for camel to pull upon. Even than these may be useful for small work particularly in plain canal irrigated land.

Bund former can be used for making bunds at the rate of 3500 - 4000 meter per hour.

Camel owners use to supplement oil and Gur to their camel on ploughing days. Apart
from that moth daal, Bajra flour, Fitkari, Ghee and milk etc. are also given as source of energy.

Table 1

**Camel drawn agricultural implements and their possible uses.**

<table>
<thead>
<tr>
<th>Implements</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deshi plough</td>
<td>Ploughing &amp; sowing the land</td>
</tr>
<tr>
<td>2-tyne plough</td>
<td>Intercultural operation and seed bed preparation</td>
</tr>
<tr>
<td>3-tyne plough</td>
<td>Intercultural operation and seed bed preparation</td>
</tr>
<tr>
<td>Moulded blade plough</td>
<td>Tillage operation</td>
</tr>
<tr>
<td>Disc harrow</td>
<td>Secondary tillage farm operation</td>
</tr>
<tr>
<td>5-tyne cultivator</td>
<td>Digging, seed bed preparation, sowing &amp; weeding</td>
</tr>
<tr>
<td>Blade harrow</td>
<td>Seed bed preparation</td>
</tr>
<tr>
<td>Bund former</td>
<td>Bunds making</td>
</tr>
<tr>
<td>Ridger</td>
<td>Digging</td>
</tr>
</tbody>
</table>

Table 2

**Data related to improved agricultural implements**

<table>
<thead>
<tr>
<th>Implements</th>
<th>Draught force Kg F</th>
<th>Effective ploughing Capacity ha/h</th>
<th>Unit force Kg F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivator</td>
<td>85.38</td>
<td>0.158</td>
<td>0.122</td>
</tr>
<tr>
<td>Moulded blade plough</td>
<td>82.67</td>
<td>0.045</td>
<td>0.247</td>
</tr>
<tr>
<td>Disc harrow</td>
<td>65.89</td>
<td>0.148</td>
<td>0.100</td>
</tr>
<tr>
<td>Ridger</td>
<td>42.67</td>
<td>0.055</td>
<td>0.440</td>
</tr>
<tr>
<td>Bund former</td>
<td>17.91</td>
<td>-</td>
<td>0.158</td>
</tr>
<tr>
<td>Blade harrow</td>
<td>33.75</td>
<td>0.056</td>
<td>0.146</td>
</tr>
</tbody>
</table>
CONCLUSION

Camel has been extremely useful animal of the desert, which can be used, in multifarious modes of functions such as pack animal, to pull cart, to pull agricultural implements and for riding purposes. As a pack animal it can bear load equal to 225 - 295 kg and travel 32 km, in a day at a speed of 3 to 4.5 km per hour. It can pull camel cart with loads of 18-20 quintals for 20-30 km in a day. Riding for a distance of 30-40 km can be accomplished in a day. It can be used to pull agricultural implement like one, two or three tyne plough and cover land equal to 3-4 beegha in a day.

★ ★ ★