Animal traction for transport in Madagascar

Rivo Andrianaivoarivony
MITA Network Coordinator
Paul Starkey
Animal Traction Development

Madagascar
- Population: 14 million people
- Area: 585,000 km²
- Average income per person: US$ 375
- Economy: mainly agriculture.
- Rural population: 75%.
- Climate: tropical.
- Rainfall: 500 - 4000 mm per year (depending on region)

Animal Traction
- Ox carts – 300,000, over 100 years of experience
- Pietonage (puddling rice swamps)
- Harrowing and levelling
- Plowing (mouldboard plows) – (not widespread, relatively recent, in 20th century)
- Horses (few < 3000)
- Donkeys (few < 100)

Madagascar, the most beautiful country!

Madagascar, friendly people!

"Pietonage" puddling rice fields with cattle
Plowing with oxen (mouldboard plow)

Harrowing and levelling rice fields with oxen

Traditional ox cart- central area

Caravan of traditional ox carts on main road

Donkey carrying water in the south

Small population of horses used mainly for racing, recreation and tourism

Horse stage coach, Antananarivo
A small number of horses are used for public transport in Antananarivo.

Need to reduce people’s drudgery and increase transport capacity.

Many rural transport problems.

Rural transport problems for men and women.

Need to improve transport and mobility for rural women.

Why do we not find a system to let the animal help this man carry his load?
Why not a more efficient system?

MITA

- MITA
  Réseau malgache de développement des moyens intermédiaires de transport
  Madagascar Network for the Development of Intermediate Means of Transport (IMTs)

- Moyens Intermédiaires de Transport Améliorés
  (Improved IMTs)

- MITA
  'Passing through, overcoming obstacles'

Transport Sector Programme

- National investment programme in transport
- Part to improve intermediate means of transport
- Emphasis on
  - Cycle based technologies
  - Animal traction (especially ox carts)
  - Water transport
  - Hand carts, wheelbarrows and rickshaws
  (also credit promotion, small infrastructure, policy, safety and other issues)

MITA network of partners

- Government
- National NGOs
- International NGOs
- Credit organisations
- Private sector: manufacturers, importers, workshops etc.
- Public services (training, research, extension, media)
- User and/or operator associations
- The rural transport unit (national transport project) is an influential member of the MITA network, but it does not control it.

National network: stakeholders

National network: geographic

Andrianaivoarivony and Starkey
Animal traction programme

- Small projects of promotion of ox carts implemented by NGOs
- Adaptive research (NGOs), on cart design and wheel technologies
- Improving credit (with credit agencies)
- Information exchange and training
- Promoting suitable policies

Ox carts in Madagascar

<table>
<thead>
<tr>
<th></th>
<th>1985</th>
<th>1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antananarivo</td>
<td>70 793</td>
<td>91 479</td>
</tr>
<tr>
<td>Fianarantsoa</td>
<td>9 652</td>
<td>8 523</td>
</tr>
<tr>
<td>Toamasina</td>
<td>12 505</td>
<td>14 436</td>
</tr>
<tr>
<td>Mahajanga</td>
<td>60 195</td>
<td>70 659</td>
</tr>
<tr>
<td>Toliary</td>
<td>70 495</td>
<td>79 158</td>
</tr>
<tr>
<td>Antsiranana</td>
<td>11 048</td>
<td>23 822</td>
</tr>
<tr>
<td>MADAGASCAR</td>
<td>234 688</td>
<td>288 076</td>
</tr>
</tbody>
</table>

Ox cart with wooden wheels in South carrying water

Ox cart with metal wheels in South
Ox cart transport in Madagascar

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price (central area)</td>
<td>$US 280</td>
</tr>
<tr>
<td>Pair of oxen</td>
<td>$US 350</td>
</tr>
<tr>
<td>Days used per year</td>
<td>84</td>
</tr>
<tr>
<td>Average distance</td>
<td>22 km</td>
</tr>
<tr>
<td>Average load</td>
<td>560 kg outward, 250 kg return</td>
</tr>
<tr>
<td>Transport revenue</td>
<td>$US 1 per tonne-km</td>
</tr>
<tr>
<td>Life of cart</td>
<td>19 years</td>
</tr>
</tbody>
</table>

Ox carts are important to go to and from market

Traditional ox carts make ruts in roads

Transport professionals want to ban traditional wheels

Woman responsible for a small workshop making traditional ox carts

Ox cart with metal wheels in northwest carrying boat

Ox carts with pneumatic tyres southwest
Local artisans make cartwheels in the villages

Making traditional wheels:
heating the metal rim

Making traditional wheels:
fitting the hot metal rim

Making traditional wheels:
cooling the metal rim

Advantages of cartwheels

Users and farmers say wooden cartwheels are:
• Cheaper
• Easily available in the villages
• Puncture free
• Long-lasting (twenty years)
• Very good brakes
• High clearance for poor roads and for water
• People can push on spokes
• Right sound (people can hear them coming)

Ox carts with large wheels can operate on bad roads
Ox carts with large wheels can enter rice swamps and other water.

**Use of pneumatic tyres**
- Does not damage road
- More comfortable (for people, and ‘ambulances’)
- Better in sand
- Easier to pull
  - Used with human carts, single oxen, donkeys
- Mainly used near capital (availability) and in south (carrying people, sandy conditions, small oxen)

In the south, where people are carried, artisans make more comfortable carts with springs.

Prototype cart with shock absorbers designed by artisans.

Pneumatic tyres on sandy road.

Pneumatic tyres get punctures.
Donkey comparative advantages

**Advantages**
- Considered more powerful than oxen
- Faster
- Low risk of theft (big problem with cattle in the south)
- Adapted to arid climate in the south

**Disadvantages**
- Very rare
- Expensive (more than cattle!) as rare
- People unfamiliar and lack knowledge
- Social problems – some taboos
- Stall feeding necessary as free range difficult as neighbours hate them!

Donkey cart in the South
*(the yoke is not appropriate, but there is limited local knowledge on donkey technologies)*

Visit to the owner of a donkey cart used for village transport and preferred as an ‘ambulance’

Influencing policy
Moving from prohibition to special ways

Complementarity
Lorries and ox carts share the same road

Thank you!
Misaotra!
Welcome to Madagascar!