

# Empowering farmers with animal traction: worldwide trends, issues and challenges

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## Abstract

*The key issues that arise within the world-wide trends and challenges animal traction faces can be listed as the diversity of animals and operations, contraction, persistence, expansion, complementarity and mechanisation issues, importance of animal power for transport, equipment and operations. Animal issues include breeds, health, husbandry and welfare, increasing use of cows for work, increases in the role of donkeys and other equids. Other important issues or concerns are: gender aspects and access to work animals, participatory processes and farmer-to-farmer learning, environmental issues, status and policy issues. Overall networking and information exchange are among the best means for further development and progress.*

## Introduction

Many species of draught animals are used world-wide, including cattle, horses, donkeys, mules, buffaloes, yaks, llamas, goats and elephants.

Oxen are numerically the most important work animals as they are readily available but often fall in number due to expense, disease and theft. The number of oxen in use is generally increasing in sub-Saharan Africa.

Cows often replace oxen as part-time transport of animals. Donkeys are increasing in use as they are relatively inexpensive, low risk and drought resistant.

Horses are usually perceived as specialised transport animals, with secondary agricultural functions, but in the tropics they are limited in geographical range by health problems. Mules are mainly used for full-time, specialised transport in countries where there is a large horse population.

Water buffaloes are good for irrigated rice systems but cattle are also suitable and more available.

## Diversity of operations

Animal power assists in many ways in agriculture for operations such as ploughing, seeding, weeding and harvesting and in post harvest operations such as threshing and grinding.

In transport, animal power assists in carrying goods and people either on carts or as pack animals in urban as well as rural areas. Other operations are water raising and pumping for human consumption and for irrigation, land formation (terraces, ponds), forestry and fisheries.

Most smallholder work animals are multifunctional. This greatly influences the decisions of owners and users. Smallholder work animals often benefit several families.

## Contraction

The use of work animals has decreased markedly in highly industrialised and urbanised countries e.g. in North America, Northern Europe and Japan. In these countries the land of small scale farmers has been acquired by large scale farmers. In the same countries most people have access to affordable motor-powered transport.

Since these countries dominate the world's media (especially TV and films), the contraction of animal power is a well-known trend.

## Persistence

Animal traction is persistent in areas of traditional use in North Africa, Asia, Latin America and Eastern Europe. Animal transport, more than tillage is very persistent and complementary. Use of animals in transport (and trading) is often more profitable than in food production.

Economic benefits ensure continuation of animal-powered transport unless undermined by competing subsidies, legislation or negative image and status considerations.

Animal power remains persistent where there are many smallholder farmers with access to animals and fodder and where most people do not have access to affordable motor-powered transport or tractors. Locally-made technologies are very persistent (e.g. the ard plough). Even in industrialised countries the use of animals for farming and transport can be

persistent and very profitable e.g. among the Amish and Mennonites.

### Expansion

Animal traction is currently spreading in sub-Saharan Africa. Overall numbers and diversity of operations are increasing in most countries. Geographical ranges are spreading especially in forest interface zones. Animal traction is also spreading in certain areas of Asia, Latin America and Eastern Europe, notably in forest interface zones and up hillsides and in countries with deteriorating economies such as Cuba, Nicaragua, North Korea and some Eastern European countries. This expansion receives little world attention. Adoption patterns are often patchy and paradoxical.

### Mechanisation

Tractors are mainly used on large holdings and on irrigated land. Tractors are seldom economically successful in small scale, rain-fed farming systems with traditional crops. The problem is more economical than technological. In contrast with taxis and road trucks of comparable complexity there are no private fleets of tractors serving smallholders.

Tractors remain very popular with planners, politicians, donors and end-users but they provide short-term benefits to the smallholders.

Business people and local leaders may invest non-agricultural income in tractors for prestige even though the tractors are capital depleting.

### Complementarity

Motor power and animal traction can work in complementary ways. Complementarity is increasing, notably where tractors and trucks do primary tillage and long distance transport while animals do the secondary tillage and feeder road transport.

Animal power often has a comparative advantage in the cultivation of small plots of land and inter-row weeding, short-distance on-farm transport, especially for forage and manures, field-to-village and village-to-market movement of produce, in inter-village transport across hills and difficult terrain, for collection of domestic water and in low cost urban transport. When motor power is available for heavy work, oxen may be replaced by cows or donkeys for the light work.

### Animal power for transport

Access to affordable animal power for small scale transport is important for agricultural production,

marketing, profitability and the quality of life of men, women and children and can lead to:

- reduction of drudgery, particularly for women,
- larger circles of production and trade, and
- stimulation of local marketing and economies.

Transport of forages and manure improves crop-livestock integration, the recycling of nutrients and animal nutrition.

In sub-Saharan Africa, the use of animals for transport is increasing. The spread of donkey carts in West Africa in the past 30 years is an example of the successful diffusion of animal power technology through public and private sector initiatives. Most successful cart introductions have used automotive technologies and not so-called 'appropriate technologies'.

### Equipment and operations

Historically most animal traction was developed by the private sector. In sub-Saharan Africa industrial technologies were introduced without infrastructural backup.

Weeding becomes a key issue after plough introduction. A generation ago, most animal-ploughed fields in Africa were weeded by hand. Adoption of weeders is now taking place in many locations, with a 'patchy' diffusion pattern

There have been relatively few recent equipment introductions. Much farmer and artisan innovation has related to equipment use. Mouldboard ploughs are seldom used as extension advice. Many lessons are available from indigenous technical sources.

The locally-made ard has been very persistent in countries like Ethiopia. Local supply of equipment and components is often a constraint.

Animal power has few advantages for equipment that needs rotary power.

### Animal issues

Lack of available and timely power is still a key constraint. Nutrition is often cited as a problem and is often an economic constraint. In this regard there is need for low cost solutions. Transport animals are likely to be fed better than ploughing ones. Disease remains a limiting factor, particularly in humid areas.

Distribution of work animals in Africa is related to disease factors such as trypanosomiasis and African horse sickness.

Larger work animals can be acquired or bred but generally multipurpose functions, environmental constraints and economic factors restrict this option. There is need for caution and appraisal prior to new introductions. Animal welfare requires participatory collaboration and training with users. 'North' animal welfare lobbies create opportunities and limits.

### Increasing use of work cows

Cows are increasingly used for light cultivation and for transport. Cows as multi-purpose animals optimise smallholder production when land and feed are limited. This farmer-led trend may be opposed by extensionists. Multipurpose cows are more profitable than oxen as cows produce calves and normal quantities of milk, if fed well. Cultural traditions change rapidly where cow use is profitable.

Conditions favouring the change from oxen to cows include:

- high cost of oxen and/or risk of theft,
- shortage of grazing land or fodder production,
- zero-grazing feeding systems,

Preconditions that discourage use of cows include:

- requirement for regular, heavy work,
- ample grazing,
- cheap oxen (e.g. stratified systems),
- low demand for milk, and
- availability of equids for transport work.

### Increasing use of donkeys

Donkeys are increasing due to drought resistance and low cost. The initiatives are primarily farmer-led and often involving women. Donkeys in Sahelian countries increased 300% in 50 years. In West Africa the East-West 'donkey line' is moving southwards. Donkey populations have been increasing in semi-arid Eastern and Southern Africa associated with drought conditions. Transport donkeys are also increasing in dry and mountainous regions, e.g. Pakistan and Colombia. Donkeys are increasingly used for farming operations as well as transport. Farmers prefer cattle for strength and prestige but adopt donkeys for their low cost and drought survival characteristics. Although transport animals, donkeys are taking over the agricultural role from oxen. Declines in donkey populations (as in European Union) are generally associated with widely available motor transport.

### Gender issues

Women are major transporters of goods and domestic requirements, but men are the main users of animals for transport. Work animals have generally been owned and controlled by men. There is much potential to reduce the drudgery for women and

increase their productivity through the use of animals. Women have less purchasing power and fewer economic options. Animal power may not be affordable for 'domestic' work and production. Women have less access to credit, information and training.

This situation is changing. Women are increasingly using animal power. As men go to work in towns or succumb to AIDS, women are increasingly users of animals for transport and crop cultivation. As men adopt new technologies such as motorcycles and tractors, women have increasing access to animal-power technologies. Donkeys may offer particular benefits for women due to low cost, ease of training, work and management and absence of cultural constraints. There is a need for gender analysis and to understand women's perspectives.

### Participatory processes

The importance of participatory extension and research needs to be emphasized. Most animal power technologies spread from user to user. 'Top-down' approaches to extension and development of 'improved' technologies have generally failed. Top-down approaches have some success when first introducing animal power. Greater successes have emanated from participatory methodologies e.g. Arado combinado, introducing weeding technologies. It is important to introduce a critical mass for adoption. For example there is a need for enough puncture-repair works for the person to start a business. There is need for support services for example blacksmiths, veterinary care and trainers. There is much evidence that credit can assist adoption. There is need for farmer-orientated networking between farmers, between researchers, extensionists and farmers as well as national stakeholders, backed by international exchanges.

### Environmental issues

Pressure on land is making hillside agriculture more widespread, with shorter fallow periods and increased deforestation. The risks of erosion are very serious. Animal traction can be used in hillside agriculture, provided there are appropriate conservation measures and appropriate implements (e.g. reversible ploughs). Work animals can be used in terrace formation. Fodder for work animals (oxen, cows, horses, donkeys) can be grown on living bunds. Conservation tillage is needed to reduce erosion and conserve soil and water.

### Status issues

Animal power has old-fashioned image particularly with the young. This affects the attitudes of all stakeholders. Senior public sector officials

(politicians, academics, civil servants) often deny the importance of animal power. Planners generally link animal power with poverty and not poverty alleviation.

Marginalised people often aspire to own and use work animals, but planners are often unaware of this: 'a person without a donkey is a donkey...'

The poor image and status could be the most important constraint to animal power development in the coming years. Improving the status and image of animal power, and linking planners with aspiring users is a vital network objective.

### Policy issues

Many national policies influence animal power use. Some marginalise rather than support animal power. Some aspects that need to be addressed by policy are:

- Agriculture (prices, markets, extension, tractor subsidies)
- Livestock and veterinary (disease, nutrition, welfare, breed characteristics, switch to equids or cows, livestock movement)
- Industry (supplies of local or imported equipment)
- Transport (e.g., prohibitions versus lanes for slow-moving vehicles)
- Motor vehicles drivers often consider animal-drawn carts are dangerous nuisances. They often want them banned.

- Prohibition of animal vehicles is generally a matter of prestige and improved traffic movement objectives are seldom met.

Animal power can be developed by informal and private sectors. Progress may be accelerated using participatory methods. However few researchers or extensionists have adequate training in either animal power or participatory processes. National and international networks can influence policies.

### Networking and exchanges

Much knowledge, skill and experience on animal traction exists in villages and in organisations worldwide. Many people need to benefit from such knowledge. Animal traction networks can help exchange the information. Networks (national or international) link people and create a critical mass for action and professional support.

Networks should be multidisciplinary and participatory, with active programmes and delegated responsibility. National networks should facilitate participatory exchanges between animal users, other stakeholders and professionals. A good example is where policy-makers are learning from farmers in Madagascar. There is need for national and international network collaboration, among organizations such as ATNESA, RELATA, IFRTD, SANAT, KENDAT, APNEZ and others. It is important to back activities with objective monitoring and evaluation.