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Research needs of donkey utilisation in Ethiopia

by

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Abstract

Ethiopia has about four million donkeys or 32% of all the donkeys in Africa and 10% of the world population. Although donkeys are found in all the ecological zones of the country (arid to alpine), the majority are found in the Highlands. In all zones, donkeys are primarily used as pack animals. The low level of development of the road transport network and the rough terrain of the country makes the donkey the most valuable pack animal under the smallholder farming systems of Ethiopia.

The great value of donkeys to rural, urban and peri-urban communities has been largely ignored by the authorities. In most Ethiopian societies, especially among agricultural staff, donkeys have a bad image and are mildly ridiculed in conversation and through traditional words and phrases. Despite the importance of donkeys in the Ethiopian economy, very little research relating to donkeys has been carried out. This paper recommends researchable issues to improve the use of donkey power in rural Ethiopia. These include:

- *socioeconomic studies: the contribution of donkeys to production systems and policy issues*
- *animal studies: nutrition, management, disease and breeding*
- *technology and use: harness, carts, traction*
- *institutional studies: human resources, extension and other services.*

It is emphasised that research on donkey utilisation should be carried out both on-station and on-farm for faster technology generation and development. It is stressed that there are real opportunities for research on donkeys in Ethiopia.

Introduction

The donkey is widely distributed throughout Ethiopia. It is most commonly found in the dry and mountainous areas. Its numbers are very small or it is totally absent in the tsetse dominated western and south-western regions of the country.

The total number of donkeys, their numbers in relation to the human population and their contribution to the total biomass of domestic herbivores are considered to be useful indicators of their economic importance. Table 1 shows these values for Ethiopia and other parts of the world for comparative purposes. Almost 10% of the world's donkey population and 32% of African donkeys are found in Ethiopia.

The domestic donkey of Ethiopia traces its ancestry to the wild asses found in Egypt, the Sudan, Somalia and Ethiopia, namely *Equus asinus africanus* and *Equus asinus somalicus* (Fesseha, 1991). There are several different types of donkey in Ethiopia, some of these are described in Table 2.

The donkey is hardier than the horse, survives with much less attention, derives sustenance from poor quality food and can tolerate considerable heat and dehydration. This makes it a suitable animal for harsh environments and difficult working conditions. Its main role is that of a beast of burden, typically transporting materials such as:

- grain from agricultural areas to the various markets
- fuel-wood and animal dung to markets and for home use
- water for home consumption
- crop residues for animal feeding and construction
- building materials such as sand, gravel, wood and stones.

In rural areas donkeys are generally highly appreciated, but many people living in towns and cities seem to have a poor view of the donkey. The donkey has not been given the attention it deserves in terms of research and development, despite the very important role it plays in the socio-economic life of the Ethiopian farming population.

Table 1: Number and importance of domestic donkeys in selected countries

Area	*Number (000s)*	*Density (head/km²)*	*Number per human*	*% of domestic animal biomass*
World	39,700	0.30	0.019	1.2
Africa	12,000	0.40	0.039	2.4
Egypt	1,800	1.79	0.082	13.5
Ethiopia	3,900	3.54	0.15	5.2
Morocco	1,500	3.36	0.14	10.3
Americas				
North/Central	3,700	0.17	0.068	0.80
South	4,200	0.24	0.054	0.82
Asia	18,200	0.68	0.012	1.5
India	1,000	0.34	0.002	0.18
Pakistan	2,600	3.35	0.054	3.3
Iran	1,800	1.10	0.12	5.5
Europe	1,200	0.26	0.018	0.37
Australia	5	<0.01	0.001	<0.01

Source: after Wilson, 1991

An exception is the Arsi Rural Development Unit (ARDU) which has done some work on the development of carts for donkeys. It has successfully introduced donkey carts and cart mounted water tanks as a result of intensive extension work in the project area.

Donkeys and the whole issue of animal power have not been given any attention in the new organisation of agricultural research in Ethiopia. The topic is not recognised as one of the commodity research programmes. As a result, research staff with relevant training and the experience to conduct meaningful investigations on donkeys are not available.

Recommendations for research on donkeys in Ethiopia

The following recommendations are based on the authors' observations, their discussions with many people and the methodological approaches recommended for South Africa (Starkey, 1995).

Research approach

The direction of research should follow the requirements expressed by the end users. It is important that, from the outset, researchers plan and implement their programmes in consultation with both extension personnel and farmers. Not only will this ensure action-oriented programmes, it will also help remove any historical barriers between researchers, extensionists and farmers.

Table 2: Description of some donkey types in Ethiopia

Name	*Typical height at withers (cm)*	*Other characteristics*
Jimma donkey	95–100	Head is large, ears short, colour grey.
Abyssinian donkey	86–102	Predominant colour is grey. This is the most widespread of all types in the country.
Ogaden donkey	103	Tall with heavy bones.
Eritrean donkey	113–115	
Sennar donkey	100–114	Large and with 'better' body conformation than the other types

Source: Dreyfus, 1976; Fesseha, 1991

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Research initiatives should start with a detailed analysis of existing experiences. Such analyses with a knowledge of the target systems, should lead to precise definitions of the required tasks and the available resources that are necessary to ensure that the research output is appropriate. The research should be farmer-centred.

Farmers require technology that is effective, affordable and that can be maintained in their villages. In the past, attempts have been made to develop high quality implements which ultimately have been too costly for the farmers. The lesson from this appears to be that technology that is intrinsically excellent may not be appropriate.

It is quite normal for research programmes to start on-station. The studies should, however, be replicated on farmers' fields at an early stage. For example draft animals maintained on research stations are often much heavier than village animals. As a result, operations easily performed by animals on-station have proved to be excessive for animals owned by farmers. Farmers are likely to give the most valuable information in their own environments. It thus seems essential that researchers should regularly discuss with farmers their problems, ideas and reactions. The research on donkeys should also be multi-disciplinary involving social scientists, agricultural economists, animal and veterinary scientists, agricultural engineers, agronomists, soil scientists and extension specialists.

Organisational and institutional issues

As indicated above, whatever small amount of research was conducted on donkeys in the past, was done without any coordination. Consequently, the usefulness of the dispersed research activities was not as effective as it should have been. There is thus an urgent need to organise future research activities at the national level and to have a planned national donkey research programme to provide a guide to institutions involved in donkey research.

Initially, research on donkeys is likely to be undertaken by several different institutions, collaborating through networking and joint programmes. Those involved are likely to include universities, agricultural research centres, non-government organisations and regional agricultural bureaus. In the long-term the aim should be a permanent multi-disciplinary team with its own coordination centre.

Economic and policy issues

Socio-economic issues

Little is known about the economics of donkey utilisation at household level. This includes factors such as the affordability of animals and the labour implications of owning and/or using donkeys. It is important to study who are the present users of donkeys by age, gender and social position. A greater understanding of this could influence a range of other donkey utilisation research relating to implements, support services and policies. Recommended areas for research are:

- assessment of the role of donkeys in the socio-economic life of the farming communities in different regions of the country
- assessment of the attitudes of farmers in different areas of the country to donkeys
- myths about the donkey.

Extension programmes backed by sound on-farm research are required to determine ways of optimising the value of draft animals to the farmers who own them. Important issues are:

- the relationship between demographic features of households and the relevant indicators of animal power adoption
- adaptation of implements to both mono and mixed cropping systems
- need for multipurpose or separate component implements for key on-farm operations to minimise the problems of labour shifting and consequent loss of potential economic gains.

Recommended areas for research are:

- establishing the long-term gains which accrue from the use of animal traction
- identification of appropriate implements and animals most suited to the agro-ecologies of specific regions.

Policy and impact

Ethiopia is a less developed country with poor infrastructure and rugged topography. This means that the donkey will continue to play a significant role in the life of rural communities in the foreseeable future. Current policies do not give due attention to the donkey and animal power in general. A positive policy environment that recognises the past, present and potential future contributions of donkeys and other draft animals will be recognising a valuable option for empowering rural communities. The donkey, in particular, needs to be portrayed with positive

modern images as a valuable component of the agricultural system. There is also a need for research to identify the legislation needed to support animal traction at the national level.

Animal issues

Genetic resource and improvement

Recommended areas for research are:

- identification and characterisation of the donkey breeds and types in the country
- evaluation and selection of indigenous breeds with particular reference to conserving desirable genes (eg, for disease resistance)
- survey of breeding and breeding methods used by farmers in different parts of the country
- management of breeding
- the effect of work on reproduction and the implications for small holder farmers.

Health and disease control

Part of the donkey's ability to thrive in harsh environments derives from its resistance to certain diseases and its tolerance of others. This has allowed it to have a wide natural distribution. A survey of the parasite load of donkeys in the Central Highlands of Ethiopia indicates that the donkey can thrive well under extreme cases of parasite load that are not tolerated by other livestock species (Fesseha, 1991). Work by the Faculty of Veterinary Medicine indicates that gastrointestinal helminthiasis is widespread in the working donkeys of Menagesha and Debre Zeit. Of the total 1885 donkeys examined for parasite ova, only two were found negative.

Many of the health problems in donkeys are mechanical in origin resulting from mistreatment by owners or drovers and from ill-fitting or badly designed harnesses. Recommended areas for research are as follows:

- epidemiological surveys to determine the prevalence, incidence and economic importance of donkey diseases
- economic analysis of available disease control strategies
- investigations on the extent of mineral deficiencies in donkeys and appropriate means of control including the use of local remedies and products
- studies on work animal grazing systems with a view to reducing the parasite burden
- research on the stress physiology of donkeys relating to the interactions between hot environments, work, undernutrition and diseases.

Feeds and nutrition

Once work is finished donkeys are left to scavenge near villages and roadsides. The body condition of the animals thus varies with the fluctuating seasonal availability of grazing. Supplementary food is rarely given. Consequently, donkeys suffer from protracted chronic undernutrition, especially during the dry season which coincides with the time of farming operations that require most of the work output from the donkeys.

There has been virtually no research work on suitable rations for donkeys under conditions of maintenance, reproduction, lactation or work. Most donkeys undoubtedly get most of their nutrients from free-range grazing. Donkeys are unselective feeders and because of this dietary habit the crude protein content of their food can be 80% less in dry season conditions than during the wet season, compared with only 43% less for camels and goats, 55% for sheep and 68% for cattle. The nutritional strategy of donkeys is to digest foods less well than ruminants but to maximise nutrient intake through a high voluntary food intake.

The nutrient requirements of male animals are relatively straightforward. Work may double the maintenance energy requirements and nutrient intake must be high enough to meet these requirements if the animal is not to lose weight. Farming systems research is required to determine ways of producing adequate food for draft animals on the farm and to determine types of locally available supplements which might provide an adequate diet. The nutritional requirements of female draft animals are more complicated and research is required to determine the types of local foods which can best support lactation and pregnancy as well as work. The effect that work and exercise have on voluntary food intake, rate of passage and digestion is at present not clear. This topic requires more clarification.

We recommend research to include the following topics:

- survey of the feeding of donkeys in different regions of the country and as compared to other classes of stock

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research into water requirements, particularly for animals used for hard work

the availability of foods and their use for improving production

improving food quality by processing

the use of biotechnological techniques, particularly those involving fungi

food utilisation and energy requirements for work and other production processes

the relationship between underfeeding, weight loss, poor performance and predisposition to disease.

Management/husbandry

Recommended areas for research are:

survey of the management of different classes of donkeys (male, female, young etc,) in different parts of the country

basic research into the efficiency of use of male and female animals for work.

Technological issues

Harnessing and implements

It is a requirement for a research programme to incorporate farmers' needs into implement design. There is an urgent need for the design and testing of appropriate implements for various activities powered by donkeys. Existing materials and designs should be reviewed in collaboration with farmers. From the outset, one research target should be to identify designs and materials that can be manufactured and repaired in rural areas. Recommended areas for research are:

assessment of the work load of donkeys in different parts of the country

the development and evaluation of lighter, more easily handled carts and implements with fewer specialised fastenings that are acceptable, affordable and durable

the design of pack saddles for use in areas inaccessible by carts

the design of harnesses that are efficient and comfortable

the design and supply of suitable cart axles and wheels for use in rural areas

cheap and humane systems for carrying water in drums or bags on the backs of donkeys.

There is a need for an accessible collection of implements. These should be maintained at a centre so that researchers and users from anywhere in the country can come to view and try them out.

Technology transfer

Recommended areas for research are:

identification of the socio-economic, technical, ecological and agronomic factors which facilitate or hinder the transfer of technology and on-station and on-farm research into these factors

ways in which extension services can be improved

the use of innovative farmers to disseminate information

the importance of rural credit schemes and other incentive packages on technology transfer.

Conclusions

The lack of any coordinated research on donkeys in Ethiopia in the past means that there are no existing arrangements or institutions which need to be changed - something which is always difficult. The opportunity therefore exists to design completely new programmes, as recommended above, free from any historical constraints and taking advantage of the increasing research work on donkeys in many other countries

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