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Review article

Animal traction as source of farm power in rural areas of Sokoto state, Nigeria

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ABSTRACT

Animal can be very important for carrying domestic water and fuel, reducing drudgery (particularly for women) and reducing time that can be used in other productive or socially important tasks. Foods production, distribution and rural trade are also assisted through animal-powered transport (on-farm, marketing, riding, pack transport. Animal power can also be used for water-lifting, milling, logging and land excavation and road construction Animal power requires little or no foreign exchange. Money invested in animal power circulates within rural areas, helping to revitalize rural economies. While motorized power also brings many benefits, animal power is normally more available and affordable to people in rural areas and fragile environments. The use of farm animal traction is actually on the increased in many countries, it should be included in educational curricula in secondary schools, polytechnics and universities in Nigeria. Government agricultural activities mostly focused on tractor power. There is no need for increased effort towards animal traction since it is a more affordable farm power. The paper aimed at drawing the attention of Extension agents, researchers, decision-makers and teachers on the need to bring animal power topics to focus.

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1. Introduction

Domestic work animals exist in all regions of the world (Bello *et al.*, 2012). Animals assist in eliminating poverty, reducing drudgery and creation of wealth. Animal traction is particularly important for food security in smallholder farming systems (Barrett *et al.*, 1982; Allagnant and Korama, 1984; Pannin, 1986). In traditional agrarian societies, like Sokoto state, where 90% of the farmers are relatively poor and subsistent, farm animal traction is the easiest way out if we really want to multiply food production several fold (Bello *et al.*, 2012). Animals can assist directly with crop production (ploughing, planting, and weeding). Food production, distribution and rural trade are also assisted through animal-powered transport (on-farm, marketing, riding, pack transport).

2. Types of draught animals

Many different types of animal are employed, particularly cattle (oxen, bulls and cows), buffaloes, horses, mules, donkeys and camels (Bello *et al.*, 2012). Animal power is expanding in Africa. It is widespread and persistent in Asia and Latin America. Animal power has many benefits, though is a renewable energy resource that is particularly suited to family-level farming and to local transport (Apetofia, 1988; Koroma 1984). Animal power is generally affordable and accessible to the small holder farmers, who are responsible for much of the world's food production. The availability of animal power allows women and men to increase their efficiency and reduce their drudgery, compared with manual alternatives (Conroy, 1988, Corbel 1986, Bordet 1989, Philip *et al.* 1988, Bello *et al.*, 2012). The combination of timeless and time saving in field operations promotes the achievement of higher and more reliable crop yields. The transport role of animals is important for carrying farm inputs (seeds, fertilizers, and crop) protection requites and outputs (harvested crops and animals products) (Bangura *et al.*, 1983). The work animals themselves contribute to food production through milk, meat, manure and offspring (Bello *et al.*, 2012). Pack animals and cars facilitate the marketing of produce, stimulating local trade and production. Animal can be very important for carrying domestic water and fuel, reducing drudgery (particularly for women) and releasing time that can be used in other productive or socially important tasks. Animal power requires little or no foreign exchange. Money spent on motors and machinery is exported from rural areas. Money invested in animal power circulates within rural areas, helping to revitalize rural economies. While motorized power also brings many benefits, animal power is normally more available and affordable to people in rural areas and fragile environments (Van, 1992).

3. Role of family in animal traction

Provided access to animal is widespread, animal power can benefit all members of society. Access may come from ownership, which provides timeliness. However, most communities have systems for borrowing or hiring animal power, so spreading the costs and benefits. Historically, men have tended to control animal power technologies, including ploughing and transport. In many countries, women are having increased access to work animals. Women, as major carriers of water, fuel woof, food grains and agricultural products can benefit particularly from transport animals (Blench 1987, Van, 1992). Animal power is a forgotten solution. Despite its many benefits, animal power is old technology. Although its use is actually increasing in many countries, it is seldom included in educational curricula. For the past fifty years, books on farming, whether for school children or agricultural students, have focused on tractor power (Conrox, 1988). The result is that, most extension agents, researchers, decision makers and teachers have never studied animal power topics in details. With the new generation the vicious circle of neglect increases (Bello *et al.*, 2012). This is compounded by international media (television, films, and publications) in which animal power is seldom portrayed and perceived by younger generation as old technology. Although food security and self-reliance are important goals, urban-based planners and politicians often ignore the importance of animal power to rural people, as governments tackle the issues of modernization, industrialization and urbanization. The duality of animal power to transport and fieldwork requires broader responsibility and not confined to agriculture. Transport ministries seldom deal with animal power, even though pack animals or cars are useful in rural transport systems. Similarly, using animals for labour-intensive road construction can be highly cost effective, but ministry staffs are only trained to plan capital-intensive projects. Animal power can also be efficiently and profitably employed in forestry and for specific operations on estates and large-scale farms (Ramaswamy, 1985; Bello *et al.*, 2012).

4. The technology of animal traction

Ploughing is often the major farming operation performed by work animals. Animal-drawn seeder and weeder are becoming increasingly important, as these facilitate rapid and timely operations. Work animals can assist with field leveling, crop harvesting and on-farm transport. In some countries, animals are employed for field irrigation and for crop processing (Van, 1992; Francis, 1988). Although most animal-drawn equipment is quite simple, its design is crucial. The implement and spares must be easily available to farmers. In countries with a long history of animal power, traditional ploughs tend to be very persistent. Not only have the designs been proven over hundreds of years, but local infrastructure exists for their manufacture and maintenance (Van, 1992; Bello *et al.*, 2012). Engine power, where available and affordable, can achieve the highest saving in time and labour. Many smallholder farmers would like to benefit from tractor power, but such aspirations are often unrealistic. Engine power tends to be appropriate for large-scale farming and long-distance transport. Animals are often more affordable and appropriate for small-scale farming and local transport. Individual tractor ownership is seldom possible for farmers with small areas of cultivation, unless they have high-value crops, irrigation and/or multiple cropping (e.g., irrigated rice production). Tractor hire (public or private) is seldom viable to smallholder farmers in rain-fed, food-production systems. Work animals and engine powered (tractors, trucks and pick-ups) can coexist in the same area – even on the same farm. Tractors is better adapted for power-intensive operations (e.g., ploughing) and for large areas of land. Animals may be more appropriate and affordable for control-intensive operations (e.g. weeding) and on small areas of land (Garba *et al.*, 2012). Produce may be transported from the fields with animals, and to the towns by trucks. The increased use of tractors and motorized vehicles for transport can even be associated with an increased use of animals, as the overall rural economy grows and diversifies (Dibbits, 1986; Harvard and Faye, 1988).

5. Strategic approach to animal traction

Animal power can be an important and viable Technology for rural development. It should be one integral component of rural development and mechanization strategies. In recent years, it has become common to include environmental and gender impact statements in development strategy documents (Garba *et al.*, 2012). In a similar way, animal power options in plans relating to food security, rural infrastructure and services and transport should be considered. Whether or not animal power is already widely used the future potential for animal energy to complement other power sources should be assessed, and the practical implications reviewed (Goe 1987; Garba *et al.*, 2012)

The neglect of animal power technology in years may have affected the availability of essential information. In many areas there may be insufficient facts and understanding to allow informed judgments on animal's power issues. In such circumstances, participatory appraisal surveys will establish the present uses of work animals, the existing constraints and the future potential.

Attention should be paid to the infrastructure and services needed to sustain animal power use (Garba *et al.*, 2012). The experience of many countries is that animal power use. The experience of many countries that animal power can develop and be sustained by small-scale private sector enterprises, provide there is a critical mass of users. It may be important to develop, or to maintain, such a critical mass, to ensure the technology is sustained. Integrated planning is required since initiatives in one domain (e.g., subsidized tractors, and promotion of new breeds) may affect other areas (e.g., water distribution, rural transport).

6. Role of private sector in animal traction

In most parts of the world, animal power is developed and maintained by private farmers and transports, supported by local artisans, traders and informal services providers. Historically, all support services (training, health care, implement supply and repair, credit provision) are available within farming communities. With industrialization, some input, such as ploughs, started to be manufactured in towns and distributed to rural areas by traders. Commercialization and marketing has enabled trading implements from one country to another. Increasingly, formal sector, they are more sensitive to changes in the overall policy environment. Farmers become more vulnerable to decisions made somewhere else (Garba *et al.*, 2012). In sub-Saharan Africa, the issue is most critical, since animal traction was often introduced through public sector initiatives. Parastatal agencies are often

crucial in providing supporting services (implement supply, credit, and health care). Commodity-based (cash crops) industries have often delivered a range of services, including training, credit and equipment supply. They have played a major role in the spread of animal power in Africa, and are still very influential (Kane, 1988; Koroma and Boie 1988).

The aim of governments and development agencies should be to ensure a suitable policy environment to enable private sector support services to be maintained or to develop. Legislation or development processes should not isolate animal power users or support services, either directly or indirectly. Recent examples of marginalization include subsidies to alternative power sources (notable tractors and imported equipment), exclusion of animal-powered transport and legislation more favourable to factories than village blacksmiths (Garba *et al.*, 2012). The public sector should avoid direct competition with private sector services, for example in the supply of animals, equipment or health products (Kane, 1988). Though some strategic input may be desirable to promote the formation of a critical mass of users. Credit provisions can be particularly important. Rural transport can often be rapidly assisted with a combination of credit and supply of cart axles (preferably supplied through local, private sector workshops). In areas where animal power is new, or an innovative technology (such as animal-powered weeding) is being introduced, participatory training programmes may be justified.

7. Way forward toward animal traction

Increasingly, the constraints to animal power development are psychological of social rather than technical or economic. Rural and urban base decision-maker and educators do not consider animal power as a modern development option (Kane, 1988). There is need to counteract existing negative and outmoded media coverage if people are to continue consider animal power as a realistic option. Animal traction need to be portrayed as a renewable technology that is relevant to the modern world. Animal power issues need to be taught in schools and discussed in the national media. Work animals should be seen as ecologically and economically appropriate in rural areas (Garba *et al.*, 2012). They should be seen as coexisting effectively with motorized systems, so enhancing the quality of community life. While motorized power is well accepted, animal power can also be portrayed as modern and environmentally acceptable. Positive, realistic and relevant images need to be portrayed though radio, television, films magazine, magazines and books (Koroma and Boie 1988). Most countries would benefit from abroad educational neglect and motivate staff. Attractive training systems and materials, such as presentation using multimedia systems and digital information technology are needed.

8. Improving animal traction in Nigeria

Animal power needs to develop and evolve. The technology should not remain static, but should respond to innovations and new challenges. Since animal traction has been largely neglected, there may be need for some basic scientific research relating to work animals, harnessing and implements. Several countries have established formal or informal national animal power networks. Many benefits arise from the exchange of experiences, skills and materials through meetings, publications and co-operative programmes. Animal power networks should be multidisciplinary and involve the public, private and informal sectors and users of animal power. They should aim to bring together people concerned with animal power including those involved in research, education, manufacturing (small and large), animal welfare, development activities (public sector and non-governmental), Farming and rural transport. Such networks can play crucial roles in identifying key constraints and possible solutions. They help to improve the image of animal power and encourage appropriate support and investment.

9. Future consideration

Animal traction continues to increase in many parts of the world, particularly those where there are significant numbers of smallholder farmers. Animal power will continue to be important for food security, self-reliance and poverty alleviation. Animal power is renewable natural resource that can assist not only in production, but also in land and water management and conservation. All countries, whatever their degree of industrialization and urbanization, can benefit from ecologically sustainable power sources. Domestic animals can play a valuable role in assisting human endeavors and improving the quality of life of women, men and children. In past years, animal power has been a neglected option, but governments, planners; agencies and the private sector are now

taking it more seriously. Animal power should become an integral part of national development strategies, including those relating to food security, resource conservation, rural transport, employment and women in developmental support, the private sector can sustain and economies. Animal power issues need to be adequately covered in education and training programmes and in modern media Animal power needs to be seen as a valuable and appropriate technology relevant to modern development aspirations (Poats *et al.*, 1986; WP-ADPP, 1993b; Philip *et al.*; 1988, Spencer 1988).

10. Conclusion

In traditional agrarian societies, like Sokoto state, where 90% of the farmers are relatively poor and subsistent, farm animal traction is a very convenient alternative to machine power, like tractors etc. We have many different types of animals to uses as sources of farm power, particularly cattle (oxen, bulls and cows), buffaloes, horses, mule's donkeys and camels. Farm animal traction is the easiest way out if we really want to multiply food production several fold. Animals can assist directly with crop production (ploughing, planting, and weeding). Foods production, distribution and rural trade are also assisted through animal-powered transport (on-farm, marketing, riding, pack transport). Animals save household (women and children) time and effort by carrying water and fuel wood. Animal power can also be used for water-lifting, milling, logging and land excavation and road construction.

Animal power is a forgotten solution, though it is still practiced in many rural areas of Sokoto state. Despite its many benefits, animal power is old technology. The government needs to increase and widen its use, by making it available through loans and provision o hiring services for animal traction. The use of farm animal traction is actually on the increased in many countries, it should be included in educational curricula in secondary schools, polytechnics and universities in Nigeria. Government agricultural activities mostly focused on tractor power. There is now need for increased effort towards animal traction since it is a more affordable farm power. Extension agents, researchers, decision-makers and teachers need to bring animal power topics to focus. The technology is simple and reliable but needs attention

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