

Report of the ATNESA
International Workshop

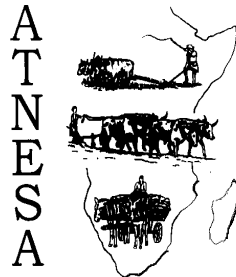
on

***Empowering
Farmers
with
Animal
Traction
into the
21st Century***

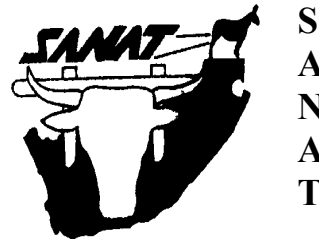
*20th – 24th September, 1999
Mpumalanga, South Africa*



**Animal Traction Network
for Eastern and Southern
Africa**



**South African Network of
Animal Traction**



Empowering Farmers with Animal Traction into the 21st Century

Report of the ATNESA International Workshop held
20-24 September 1999. Mpumalanga, South Africa

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opinions presented in this report rests with
the workshop rapporteurs and editors.
The opinions reported do not necessarily
reflect the views of ATNESA nor those of the
SANAT or other organizations that supported
the workshop and this publication.*

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List of abbreviations

ADP	Animal Draught Power
APNEZ	Animal Power Network of Zimbabwe
ARAP	Accelerated Rainfed Arable Program- Botswana
ARC	Agriculture Research Council (South Africa)
ARDP	Arable Land Development Project- Botswana
ASIP	Agricultural Sector Investment Program
ATC	Animal Traction Centre
ATNESA	Animal Traction Network for Eastern and Southern Africa
BCA	Botswana College of Agriculture
CIRAD	Centre de Coopération internationale en recherche agronomique pour le développement
CTVM	Centre for Tropical Veterinary Medicine
DAR	Department of Agriculture Research
DAP	Draught Animal Power
DCP	Department of Crop Production
DTU	Development Technology Unit
FAO	Food and Agriculture Organisation
IAV Hassen II	Institut Agronomique et Veterinaire Hassen II
IFAD	International Fund for Agricultural Development
IFRTD	International Forum for Rural Transport and Development
IMAG/DLO	Instituut voor Milieu-en agritechniek-Dienst Landbouw-Kunding Onderzoek
IT	Information Technology
KARI	Kenya Agricultural Research Institute
KSPCA	Kenya Society for the Protection and Care of Animals
NGO	Non-Governmental Organisation
NOL IDEP	Northern Regions Livestock Development Programme
PRA	Participatory Rural Appraisal
RELATA	Red Latinoamericana de Traccion Animal
RELMA	Regional Land Management Unit of SIDA
RIIC	Rural Industries Innovation Centre
SAMeP	Small Agricultural Mechanization Program
SANAT	South African Network for Animal Traction
SIDA	Swedish International Development Agency
SME	Small and Medium Enterprise
SSR	Sub-Saharan Africa
TADAP	Tanzania Association for Draft Animal Power

Introducing ATNESA

The Animal Traction Network for Eastern and Southern Africa (ATNESA) was formed in 1990 to improve information exchange and regional cooperation relating to animal draft power. The network aims to unite researchers, manufacturers, development workers, institutions and the users of animal traction in the region. Membership of the network is open to all individuals and organizations interested in its objectives.

The ATNESA steering committee, elected during major workshops, includes traction specialists from six countries in the region, as well as representatives of interested resource organizations. The committee initiates, coordinates and facilitates a variety of network arrangements.

ATNESA encourages the formation and operation of national animal traction networks, whether formal or informal. Responsibility for implementing ATNESA activities is delegated to these national networks and to ATNESA members in the different countries.

ATNESA, in collaboration with national networks and other organizations, has arranged international workshops on several themes including

Improving animal traction technology (Zambia, 1992)

Gender issues in animal traction (Tanzania, 1992)

Design, testing and production of animal-drawn carts (Zimbabwe, 1993)

Weed control using animal power (Tanzania, 1993)

Meeting the challenges of animal traction (Kenya, 1995).

Improving donkey utilization and management (Ethiopia, 1997)

Conservation tillage with animal traction in environmental sustainability (Namibia, 1998)

More than 500 people from 40 countries have participated in ATNESA international workshops and several resource publications have been produced.

ATNESA has a small secretariat in Zimbabwe to assist international liaison. Nevertheless, ATNESA encourages interested people to work with their local national networks and to contact directly, their colleagues in other countries.

The addresses of ATNESA national networks and the ATNESA Steering Committee members are given at the end of this publication.

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Acknowledgements

The organization and success of the workshop “*Empowering farmers with Animal Traction into the 21st century*” was made possible by the hard work of many different people. The ATNESA steering committee and the workshop reporting team would like to thank all those people who made the workshop possible and who assisted in the preparation of this report.

The workshop was hosted by the South African Network of Animal Traction (SANAT) and organized by a local committee which comprised of:

- Mr. Joe Kotsokoane Chairperson, SANAT
- Prof. T. E. Simalenga University of Fort Hare, Chairperson, ATNESA
- Mr. B. Joubert University of Fort Hare, Secretary, SANAT
- Mr. N. Seobi Department of Agriculture NW Province
- Prof. R. C. Krecek University of Pretoria
- Mr. V. Njani Eastern Cape Province (Commercial Farmer)
- Mr. D. Hanekom ARC, Institute for Agricultural Engineering
- Mr. P. Yoba Kynoch fertilizer
- Mr. R. Fowler ARC, Grain crops Institute, Cedara

Deep appreciation is due to all these people for their dedication and hard work. Gratitude is also due to the Institute of Agricultural Engineering the Agricultural Research Council (ARC), who provided secretariat services and logistical assistance. Special thanks also go to Ms. Denise Adams who assisted with the secretarial services during the workshop.

The workshop secretariat and other core costs of the workshop were funded by:

DFID- Department for International Development, Southern Africa Division.
Kynoch Fertilizer
Anglo-American, Chairman’s Fund
Zimplow
The University of Fort Hare.

External participants were sponsored by:
CTA - Technical Centre for Agriculture and Rural Cooperation,
CF - Commonwealth Foundation
IDPT - International Donkey Protection Trust
NRF - National Research Foundation
RELMA - Regional Land Management Unit
The National Department of Agriculture
The Land Bank of South Africa
The Royal Society in UK

Others were sponsored by their own organizations or agencies in their countries.

The ATNESA Steering Committee would like to convey deep appreciation to all the local, national, regional and international organizations that supported participants, directly or indirectly.

During the workshop many people acted as chairpersons or rapporteurs of plenary sessions, group discussions and informal evening meetings. All are warmly thanked.

After the workshop, a reporting team prepared this workshop report. The team comprised of the individuals listed on the cover page of this report as well as Mr Siyabonga Ntshatsha of Lovedale College who assisted the reporting team with word processing.

The workshop will be followed up in a number of ways, as outlined in this report. The papers submitted at the workshop, are being edited for publication as Proceedings. Summaries of papers presented have been included in this report. The follow-up activities of a regional nature will be implemented by ATNESA in collaboration with other organizations within the networking philosophy.

Lastly, the ATNESA steering committee would like to warmly thank anyone else who has been involved in the planning, implementing and support for this workshop. The Steering Committee looks forward to further close collaboration with individual members, supporting organizations and other networks.



Workshop Reporting Team

From Left to Right: PG Kaumbutho, TE Simalenga, A Pearson, R Mofya, E Waithanji, D Hanekom



Mpumalanga youthful transporters watch keenly and learn



M. Aeshlimann of Norway spares no effort to demonstrate a simple Donkey Harness

Poor animal harnessing (especially for donkeys) in Eastern and Southern Africa is one of the greatest contributors to inefficient animal powered transport.

ATNESA Workshops bring together people from far and wide and most interesting and learning experiences are exchanged, all to the betterment of rural development across nations, happier working animals (in tillage and transport), rural workers and sustained rural livelihoods.

Animal power is indeed a major and most versatile contributor to poverty eradication.

Animal traction is an affordable and dependable farm power option, not only for the "New South Africa", but for all nations that take rural development, farm and transport operational economics, seriously...

**Here is to more resources, and capacity to implement...
Long live SANAT, sister networks and ATNESA...**

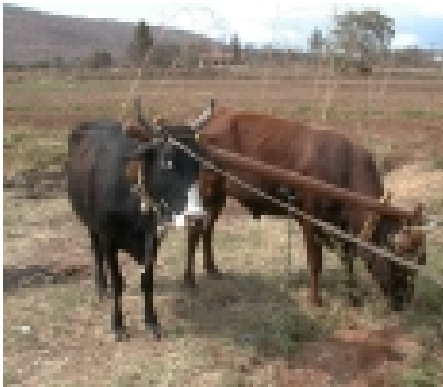


Workshop Participants

1. An overview of the workshop

Workshop background

This was the third international workshop after the 1992 Zambia and 1995 Kenya workshops. Six other thematic workshops have been held in different parts of the continent. At this year's workshop, over 100 participants were drawn from all regions of Africa and beyond. For the first time in ATNESA's history, representatives from North Africa, Horn of Africa, Central Africa, East, South and West Africa, and from Europe, Asia and South America were represented at the same forum. This shows that development concern and interest in animal traction issues spread way beyond the so-called ATNESA region.



This year's workshop theme, ***“Empowering farmers with animal traction into the 21st Century”*** was addressed at a workshop that reviewed experiences and lessons learnt by a multidisciplinary team of stakeholders. The theme led discussions towards recognizing the importance of the smallholder farmers in their contribution to global food security. Most smallholder farmers are resource poor

and constitute over 80% of domestic food producers in Sub Saharan Africa. That notwithstanding, smallholder farmers have been marginalised in the era of mechanisation - wrongly perceived as motorisation - hence supporting the minority largescale farmers. Sadly, this marginalisation has resulted in an exponential increase in numbers below the poverty line particularly in Africa and other third world regions. Fortunately, animal traction is gaining recognition after close to a decade of lobbying by its promoters under the ATNESA umbrella. A lot more action on the ground is needed particularly in changing attitudes of potential beneficiaries; as this is indeed one of the greatest constraints.

At the workshop, emphasis was clearly laid on working out ways on impacting positively on end-users by increasing food production. Thus, the smallholder farmer remains the prime client among other small business persons. A need for integrating different sectoral approaches at all levels of project cycle, including on and off-farm applied research is necessary. The aim is to achieve a holistic output with adequate food and improved livelihoods as a measure. It was with this in mind that workshop outputs were synthesized and action plans developed.

Workshop objectives

The following were the main objectives of the workshop:

1. To share regional experiences on empowering farmers and entrepreneurs on the use of animal traction
2. To review the research, development, training and extension messages regarding the use of animal traction, that have been tried in recent years
3. To analyze the existing technologies (harnesses, carts, equipment etc.), management systems (selection, feeding, animal husbandry etc.); socio-economic, gender issues, and environmental implications on the use of animal traction.
4. To make strategic plans on how to empower farmers with animal traction into the next millenium.
5. To propose future national and joint/collaborative activities.



The above objectives were addressed in form of thematic paper presentations in plenary sessions, poster presentations, evening sessions, a field visit and intensive group discussions. At the end of the workshop, strategic plans (with action plans) were developed.

Thematic paper presentations

A total of five sub-themes were addressed in five plenary sessions within the first two days of the workshop. Experiences of stakeholders in animal traction were presented as follows:

Session 1: General review

After introduction by the ATNESA chairperson, participants were presented with a country synthesis paper on South Africa by the SANAT secretary. SANAT was the official workshop host. Thereafter, papers on world wide trends issues and challenges in animal traction, conservation tillage and environment, and empowering people through donkey power were presented. General and other discussions that ensued after these and subsequent presentations are presented in the next chapter.

Session 2: Participatory rural development and technology transfer

Papers on farmers', extensionists', manufacturers' and researchers' experiences in technology transfer in the region, conservation tillage and watershed management in Kenya and farmers participation in testing of implements and harnesses in Ethiopia were presented.

Session 3: Entrepreneurship, gender and rural transport

In this session, papers presented included entrepreneurship in animal traction by empowering local initiatives in Tanzania, issues and challenges in empowering farmers and pastoralists through animal based rural transport in Kenya, gender issues in animal traction and transport in Zambia, Uganda and South Sudan, and supply and distribution of implements and spares in Southern Africa.

Session 4: Animal welfare, nutrition and management

Nutrition, management and use of draught animals were addressed in three general papers on strategies for improving the effectiveness of crop residues as supplementary feeds for working cattle in semi-arid regions, management of draught animals from a welfare and health perspective, and multipurpose use of work animals in smallholder farming systems.

Session 5: Case studies and poster presentation

Participants from different countries gave country reports and updates on the status and trends of animal power use in their countries. In this session, all regions of the continent, North, East, Horn, Central, West and Southern Africa were represented. Details on these presentations are in the section on country reports.

Posters were mounted and presented and some implements displayed. Discussions on these went on outside plenary sessions and during tea breaks.

Field visits and demonstration

Farmers in different parts of Mpumalanga province were visited and interviewed informally by small groups of seven to ten people on the third day. Participants were issued with a checklist of issues drawn from workshop objectives and discussions held at the plenary session. These and more issues would be used in action planning for the way forward later in the week.

Field visits ended with a farmers' field day organised by government officials and the SANAT secretariat. At the field day, demonstrations were held on implements, tillage practices, harnessing of donkeys, and the use of cows for traction and primary animal health care. For more effective networking, a joint luncheon was held for farmers, extensionists (and government officials) as well as workshop participants. Informal fruitful discussions were held and findings as well as lessons learnt from the contact with animal power users and industrial supporters were applied in the workshop discussions, synthesis, as well as in the final action planning.



Workshop discussion sessions

The last two days of the workshop were spent in discussions around plans for the next few years. Thematic groups were formed and requested to develop action plans on the respective themes. Both long and short-term plans were developed. Thereafter the plans were presented in plenary for discussion, appropriate changes were made and workshop participants assigned specific tasks. Each task was allocated a realistic time frame. Many of the actions required minimal external funding but there were some that will definitely require a financial input. Details of the action plans are included in this report.

Thematic action planning

Themes requiring action planning were divided broadly into nine categories:

1. Policy and socio-economic
2. Technology
3. Work animals
4. Harnessing
5. Feeding strategies
6. Training and field days
7. Image/status of draught animals and their use
8. Participatory processes
9. Environmental issues

The first three groups were asked to consider the next 5-year strategy for each subject. The other groups were asked to look specifically at key issues and how they should be progressed in the future. Details on each appear elsewhere under workshop recommendations and follow-ups. Issues such as strengthening networking by ATNESA opening a web-site and using the site for information exchange and dissemination was suggested by almost every group. The summary below does not represent all key issues addressed in the groups, but mentions some important issues unique to the group.

- Regarding policy and socio-economic issues, ways of involving policy makers (government officials and donors) in activities on the ground, and an aggressive sensitization of everybody on the benefits of animal traction were suggested.
- On animal issues, capacity building in the form of training at both extensionist and end-user level were

emphasized. On-farm testing of research recommendations of past animal husbandry projects (e.g. harnessing, feeding regimes and others in relation to work animals) should be carried out while ensuring that existing indigenous practices and knowledge are incorporated whenever they are relevant and complementary.

- Some recommendations from the technical group were: on-farm research on improvement of implement design, quality control of implements, participation in trade fairs and agricultural shows, facilitation of exchange visits of users and manufactures.

Workshop evaluation

Workshop participants rated the overall workshop as good to very good. Among the numerous praises the workshop received the weakness aspects that stood



out were:

- Less plenary presentations and more group work be considered in future.
- Poster presentations did not receive the formal attention they deserved but participants believed they were most informative.

An analysis of the workshop evaluation is presented later in this report.

2. Summaries of Keynote and Case Study presentations

Workshop opening speech delivered by Honourable J.B Masilela

*MEC for Agriculture, Conservation &
Environmental Affairs, Mpumalanga Province*



*Guest of honour Honourable J.B Masilela receives
ATNESA publications from ATNESA Chairman Prof
T.E. Simalenga*

Chairperson, distinguished guests, ladies
and gentlemen.

I thank you for the singular honour and
privilege of addressing this auspicious
international gathering of experts, scientists
and concerned policy makers in the field of
Animal Traction.

It is most appropriate that this workshop
should take place in Mpumalanga. After all,
history recounts numerous anecdotes and
tales of vast “migrations” of South Africans
from the Cape into the interior, and in the
colonial conflict that ensued and in the
centre of this were horses and oxen.



Few countries in the world have seen a more
wide scale use of oxen than South Africa,
where three, four and five ton wagon loads

were handled by spans of up to 16 oxen
across the plains, rivers and mountains of
S.Africa and Mpumalanga. Few here today
need reminding of the exploits of the pack
horses and oxen in Percy Fitzpatrick’s “Jock
of the Bushveld” where teams of man and
livestock constantly faced predatory
onslaughts and epidemics of *Rinderpest*,
Nagana, *East coast fever*, *Malaria* and *Foot
and mouth disease*, to name a few. Despite
these hardships, animal traction lives on and
is currently experiencing an encouraging
resurgence throughout South Africa and the
continent.

Early rains have fallen in many parts of
Mpumalanga and the rest of South Africa
and at the moment one can witness much
activity in the lands with farmers preparing
for a new cropping season.

It is at times like this that one is reminded of
the importance of animal traction to our
small-scale farmers. A recent survey
indicates that at least 400,000 smallscale
farmers still use animal traction. All of a
sudden everyone is ploughing , harrowing,
planting and cultivating their lands.

The World Bank reports, that a common
notion among developing country politicians
and developing country experts, salesmen
and technicians, is that animal traction is an
outdated and backward technology. As a
result, when newly independent countries in
Africa moved from hand-hoe agriculture to
tractorized mechanization, they invested
heavily ion the “cosmetic appeal of the
modern tractor-powered machinery”. This
investment was encouraged by Western
development and foreign aid organisations.
World Bank economists have concluded,
that the millions of dollars spent to help
African farmers buy tractors, appear to have
been wasted and the farmers would have
been better-off ploughing their fields with
mules and oxen.

In areas where rainfall is marginal and
yields are low, farmers are faced with two-
pronged dilemmas. If the tractor contractors

charge what they should to make a reasonable profit, few farmers can afford their services, and if farmers pay even the reduced rates often charged by contractors, they are not likely to make a profit themselves. It is a no-win situation. Occasionally the demand for ploughing services is so high that contractors are unable to keep pace with orders and farmers are kept waiting.

This dilemma explains the swing back to using animal traction, which is becoming more and more apparent with each new season.

Smallscale farmers are finding that it is more economical to use draft animals which enable them to be masters of their own destiny. Smallscale farmers no longer have to wait to have their lands prepared. Now with their own animals they can plough, harrow, plant and cultivate, how and when they like. As a consequence they have minimal input costs and are likely to have more money in their pockets and will be better empowered to face the next season.

Over the past five years, SANAT has established a sound foundation by highlighting the importance of Animal Traction as a power option, for large and smallscale agricultural and rural communities. It has gained the recognition of Government as well as Non-Governmental Organizations. SANAT has formed strong ties with rural smallscale farming communities, who now rely more and more on Animal Traction with the problems bedeviling the Government Tractor Scheme.

There are however, ladies and gentlemen numerous challenges that still face the industry:

- Good animal husbandry is not always correctly understood. At subsistence level, draft animals exist well on grass and hay alone. Once the animal starts working, the feeding regime should be

adapted to the amount of effort exerted. Information in respect of nutrient requirements, energy expenditure during work, maintenance requirements, energy expenditure during work, maintenance requirements, field resources and



supply, optimizing available forages etc., should be available and transferable to those dependant on animal traction, in a simple assimilated way.

- Similarly it is hoped that the engineers and entrepreneurs will increase their efforts to design, develop and produce animal-drawn equipment which are affordable, of increasing variety and sophistication.
- Women constitute the majority of farmers, but cultivate less and produce less. This has nothing to do with capacity or capability to handle draft animals. It is a cultural notion that it is somehow not 'proper' for women to handle draft animals. Full benefits from animal traction technology can only be achieved if both women and men have access to animal draft power.
- The health and welfare of all animals is an integral and central part of animal traction programmes. Let us not forget

that as draft animals increase in Africa, the demand for good blacksmiths will increase also. Presently there are insufficient workshops where farmers can have equipment repaired. Animal Traction projects need to address the training and retraining of village blacksmiths.

- The need for the very diverse smallscale farmer sector, to unite and be represented so that they may bring pressure on the authorities to re-direct training, education, research and agricultural support services to small scale farming communities.

To small scale farmers, animal draft power is the most efficient and sustainable source of traction. The constantly increasing cost of tractor repairs and diesel, which has forced so many farmers off the land, is not a threat, to small farmers and the spin off, of meat and manure, calves and milk, leather, status and animal insurance, will ensure that this industry will remain a solution in some cases but not necessarily in all cases of agricultural development.

I am particularly looking forward to SANAT's policy document at the end of the year, which by stating a clear purpose, will enable the Government to support the programme fully and in so doing Empower Rural Communities.

It is also my sincere wish that this workshop unites researchers, manufactures, development workers, institutions and all users of animal traction throughout the world, and that you determine the necessary strategic plans to improve and sustain smallholder agriculture into the 21st century.

I thank you.

2.1 General review papers

South Africa country synthesis presentation

Presented by Bruce Joubert,

South Africa Network of Animal Traction (SANAT) c/o University of Fort Hare, Alice, RSA

This paper constituted the background to the animal power situation in South Africa and it highlighted the areas where the South Africans could be assisted by the experience and advice of the delegates and the many countries they represented. Some 24 countries were represented and they were anxious to share and learn from South Africa, just as much.

The paper presented had information compiled from the information gathered during surveys, conducted in South Africa's rural areas during the last six years. These surveys had revealed conclusively that there was ongoing wide scale use of animal traction (AT) by rural communities, and to some extent, commercial farmers in South Africa. The cost of tractor powered mechanization and the demise of government tractor schemes was the main cause for the renewed and increased interest in the use of animal traction as an important power option. The national government has also now recognized the importance of AT. An animal traction policy has been included in the latest government Green Paper on Agriculture. The presentation discussed the current status of animal traction in South Africa. It raised concerns and made projections towards possible developments into the next century.

Empowering farmers with animal traction: Worldwide trends, issues and challenges

Presented by Paul Starkey

Animal Traction Development, and University of Reading, UK

Backed by a presentation of picture slides

capturing the diversity of animal traction utilization the world over, Professor Starkey raised a wide range of issues pertaining to animal traction use and development. Included were: the world-wide diversity of animals and operations, persistence and expansion of the use, complementarity roles and mechanization issues, the importance of animal power for transport, equipment and operations, and animal issues such as breeds, health, husbandry and welfare. Citing current trends, the presenter noted that there was increasing use of cows for work, increases in the roles of donkeys and other equids, gender aspects and access to work animals, participatory processes and farmer-to-farmer transfers, backed by networking and information exchange. Among the many species used worldwide were cattle, horses, donkeys, mules, buffaloes, yaks, llamas, goats, elephants, etc. Of these the most important numerically remain oxen. Cows were reported to often replace oxen where oxen are expensive or at risk. Cows have a broader multipurpose use into calves and milk. Donkeys are increasingly used as inexpensive, low risk and drought resistant animals. Horses are specialized transport animals, with secondary agricultural functions, but in the tropics are limited in geographical range due to health problems. Mules are popular where there is a large horse population. Water buffaloes are good for irrigated rice systems. The presenter noted that work animals had decreased markedly in highly industrialised and urbanised countries but in these countries, most people have access to affordable motorized transport. Economic benefits ensure continuation of animal-powered transport unless undermined by competing subsidies, legislation or a negative image and status considerations. Animal power is expanding in countries with deteriorating economies such as Cuba, Nicaragua, North Korea and some Eastern European countries.

On animal powered transport the presenter noted that 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. It reduces drudgery, and stimulates local marketing and economies.

On equipment the presenter noted that historically most animal traction development has occurred through the private sector. In sub-Saharan Africa industrial technologies were introduced without infrastructural backup. It was noted that weeding becomes a key issue after the introduction of ploughing. Adoption of weeders is now taking place in many locations, with a 'patchy' diffusion pattern.



On animal welfare issues the presenter noted that lack of available and timely power was still a key constraint and nutrition was often cited as a problem. Disease remained a limiting factor, particularly in humid areas. It was noted that animal welfare requires participatory collaboration and training with users.

On gender issues the presenter reported that 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 and there is much potential to reduce the drudgery of women and increase their productivity through the use of animals. Women have fewer economic options and animal power may



not be affordable for 'domestic' work. In situations of change women are increasingly becoming users of animal power. Donkeys may offer particular benefits for women such as low cost, ease of training and management and fewer cultural constraints. It was concluded that there is a need for gender analysis and to understand women's perspectives, combined with the importance of farmer to farmer learning. Some degree of top-down approaches may be necessary when first introducing animal power.

Various environmental issues were raised such as the use of work animals in hillside agriculture, where pressure on land is highly detrimental. The presenter further noted that the image of animal traction can be improved through networking activities, Networks such as ATNESA, RELATA, IFRTD, SANAT, KENDAT, APNEZ etc., should facilitate participatory exchanges between animal users, other stakeholders and professionals.

Preserving the environment through conservation tillage with animal traction

Presented by P.G. Kaumbutho

Kenya Network for Draught Animal Technology (KENDAT) Nairobi. Kenya.

This presentation was an overview of regional activities on a topic that is gaining popularity in the region as well as worldwide with tillage activists, smallholder farmers and environmentalists alike. Dr. Kaumbutho noted that, while tractorization programmes in the sub-sahara African (SSA) region have hardly served the power supply needs of smallholders, animal traction has proved itself as a dependable and versatile source of agricultural power with complementary roles in tillage and

transport. The 1998 Namibian, ATNESA International Workshop on conservation tillage (Contil), concluded that meaningful conservation tillage work, at smallholder level, needed a dependable animal power support and service system. As reported, the reasons why Contil practice had not become common in this region varied from developmental and technical to socio-economic and cultural.

Backed by a colourful and informative slide presentation, the presenter reported that conservation tillage has been practised in largescale farms of the region for over a decade and it was only now, slowly getting accepted as mandatory for sustainable smallscale agriculture, in the interest of environmental preservation. Researchers have either, not made tillage part of the soil and water conservation programme or research findings have not been passed on to end-users in a qualifying form. Meanwhile the region is losing as much as 290 metric tonnes of soil per hectare per year and faces an average population growth rate of 3.2%. Development and growth indicators show a region under agrarian stagnation and this does not help the situation. It is hard to push for environmental concerns to a community that cannot feed itself.

Various fragmented research, extension and development works in the region have proved the gains of conservation tillage. Efforts in Zambia and Zimbabwe have persisted and have reached levels of developing appropriate Contil equipment useable by those with access to animal power. The gains are however yet to be accepted and techniques adopted *en masse* by the farming communities. At communal, national and regional level a culture of environmental consciousness needs to be developed as a way of getting conservation tillage to the fore. Positive and active networking will reduce duplication of efforts and help sensitize all parties, including planners who can eventually include tillage in their environment policies. The issue to be addressed is how to balance the inputs

required so as to maximize efficiency and cost-effectiveness, reduce risks of soil and environmental degradation, maximize the per capita productivity, and maintain or sustain an increasing trend in productivity. Environmental preservation is a cross-border activity and nations must come together in the effort.

Among the solutions suggested were: promotion of animal traction, farmer-centered, Contil farmer-trial applied multi-disciplinary and multi-sector, research methods, environmental education; marrying traditional knowledge with new practices, farmer and other party exchange visits; identifying suitable equipment and promoting the same nationally and regionally.

Empowering people through donkey power into the next millennium

Presented by E.M. Nengomasha

*Department of Research and Specialist Services,
Matopos Research Station, Bulawayo,
Zimbabwe.*

Dr. Nengomasha noted that tractor programmes designed to provide the much-needed draught power for the smallholder farming sector, have proved unsustainable and difficult to implement in most developing countries. He noted that despite the continued promotion of tractors, the dependency of smallscale farmers on draught animal power (DAP) for crop production was likely to continue into the next millennium.

It was noted that cattle have been the predominant and preferred source of DAP in most parts of Southern Africa. However, recurrent droughts since the early 1980s had decimated their population in this region. This had resulted in DAP shortages, seriously threatening the food security of the rural people. Because of the apparent ability of donkeys to survive droughts better than cattle, they are increasingly becoming an important source of DAP in semi-arid areas.

The donkey's capabilities and hence their capacity to contribute to the empowerment of rural and urban people was discussed. The issues and challenges that are likely to face users in the 21st century and possible interventions are identified.

Land cultivation was noted to be the most important task in the crop-livestock farming systems. The capacity of donkeys to pull had been assessed and results, some of which were very encouraging were highlighted. The suitability of donkeys in semi-arid areas was largely attributed to their ability to withstand long periods without drinking water and to digest high fiber diets. With the increasing importance of the peri-urban agricultural sector, donkeys have been shown to provide one of the most cost-effective sources of transport in this sector. The presenter discussed the role donkeys play in empowering peri-urban smallholder farmers and traders, particularly in Eastern Africa. Sectors of society who can or do benefit from using donkeys were also highlighted.



The presenter concluded by noting that comparative ease of handling of donkeys over cattle, makes them more suitable for use by elderly, women and children. This is especially important with the increasing labour and other constraints caused by high mortality rates due to the HIV/AIDS pandemic. Orphans and the elderly now constitute a large proportion of the available labour in this sector. This group could be empowered by increasing the use of

donkeys. People without land in the peri-urban sector could also obtain an income through the use of donkeys in transport, while farmers can diversify into transport, building and other materials or people, if they keep donkeys.

2.2 Participatory research and development and technology transfer

Technology transfer and on-farm evaluation of animal powered equipment: Experiences of IMAG-DLO/SAMeP

Presented by A. Wanders

IMAG-DLO, Wageningen, The Netherlands

Mr. Wanders reported that instead of researching for *perfected (yet rejected)* solutions, IMAG-DLO stressed the need for a farmer participatory approach towards local development of *less perfect, yet accepted* practical and low-cost technologies based on simple and durable equipment designs suitable for local manufacture.

Without making blanket recommendations IMAG-DLO, a technical assistance and advisory services organization, recommended a technology transfer process starting with proven technologies, available locally, in Asia, West Africa or elsewhere and borrowing the relevant and useful design concepts and adapting them to the local situation. In order to be adoptable under the highly variable, low or minimum external input smallholder farming systems, main efforts are directed towards the development of *less-perfect* but practical and low cost technologies.

The presenter recommended simple, durable and light implements with scope for local manufacture and assembly by rural

workshops with due regard to the prevailing supply, maintenance and repair constraints and the general low purchase power of farmers. Another recommendation was active participation of local manufacturers in order to ensure a propagated technology which was makeable, available at affordable prices and serviceable.

Conservation tillage and integrated watershed management: Field experiences on extension approaches in Kenya and Tanzania

Presented by J. Rockstrom

Regional Land Management Unit (RELMA), Nairobi, Kenya.

Dr. Rockstrom noted that conservation tillage (Contil) involved a broad set of different production systems, ranging from manual no-till systems to reduced tillage systems, using animal traction or in some cases, tractors. He added that each Contil system was part of, and interacted with the prevailing farming system, which in turn affects physical and socio-economic entities at the watershed level, such as upstream or downstream water availability and labour allocation.

Presenting extension work field experiences on an integrated method development, with watershed scale focus on Kenya and Tanzania, reference was made to ongoing watershed development activities in Northern Ethiopia (Tigray region). Linkages between livestock aspects - with special focus on feeding strategies and availability of oxen for traction, crop husbandry, and tillage-practices were analyzed. Data from ongoing trials in Tanzania (Babati) on sub-soiling, and farmer designed trials on different conservation tillage practices, integrating soil fertility management with reduced tillage techniques were presented. An ongoing effort of establishing a conservation tillage initiative in Kenya, with

demonstration trials in different agro-ecological zones was discussed.

Farmers participatory development and testing of implements and harnesses for animal traction

Presented by M. Temesgen

National Agricultural Mechanization Research Center, Nazareth, Ethiopia

Capturing the Ethiopian experiences the presenter noted that farmers have been using the ox-drawn ard plow, the *Maresha*, for thousands of years. He reported that although simple and cheap this implement is inefficient and several researchers and organizations had been trying to introduce new implements for the last 60 years. Reportedly, farmers had rejected the new implements despite their superior field performance. The main reason for the rejection was little regard for the nature of the traditional implements and to indigenous knowledge of farmers.

It was reported that in recent times farmers and their indigenous knowledge had been used in developing a package of improved pre-harvest implements for tillage, row planting, tie-ridging and weeding. Farmers were involved in the process of development and testing of implements. In their involvement farmers conducted simple experiments comparing the new implements with their traditional ones. Reduction in labor and time requirements of land preparation, row planting and weeding, improvements in soil moisture conservation using simple techniques of tie-ridging, improved tillage, fertilizer incorporation during planting and inter row weeding have successfully been achieved. This has led to increased efficiency in utilization of animal traction and resulted in higher grain yields.

2.3 Entrepreneurship, gender and rural transport

Entrepreneurship in animal traction: Empowering rural initiatives

Presented by R.M. Shetto

Uyole Agricultural Centre, Mbeya, Tanzania

The presenter noted that the economies of most countries in Eastern and Southern Africa are going through a dynamic transformation from centralized to decentralized market-oriented economies. He noted that the current emphasis on private sector development accompanied by privatization of government institutions created ample opportunities for enterprising agricultural development. Some of the opportunities which exist were highlighted and approaches to develop and promote entrepreneurship in animal traction recommended. Some of the opportunities discussed include: draft animal hire, rural transport services, small scale manufacturing, repair and maintenance services and the establishment of rural supply and distribution centres or networks.



It was argued that entrepreneurship development in animal traction could empower farmers, youth and rural communities towards their improved income levels and rural livelihoods. It was concluded that, for these initiatives to thrive, an enabling environment is necessary as is a

change of attitudes and training in business management of target groups.

Empowering through animal based rural transport: Issues and challenges for farmers, pastoralists and artisans

Presented by C.E. Oram

*Development Technology Unit (DTU),
University of Warwick, UK*

Even at the very end of the twentieth century, most transport in rural Africa is accomplished by women and children carrying water, firewood and agricultural produce on their heads and backs. With a few exceptions, very little advantage is taken of animal transport and intermediate modes of transport (IMT). In contrast, in Asia, all manner of IMT are used. Research into the cost effectiveness of animal based transport in rural Africa confirms that investment in animal carts provides one of the highest rates of return available to rural households and yet uptake remains low. One of the reasons for this low adoption of animal carts is undoubtedly their high price compared to rural incomes.

To address this the DTU has been working with KENDAT (Kenya Network for Draught Animal Technology) and FARM Africa to lower the costs and difficulties of animal cart production in Kenya and Uganda. Working with local artisans, new cart and cart component designs have been developed and placed with cart users for testing. In most places the new carts were substantially cheaper and lighter than existing cart designs and they were not dependable on the availability of scrap automotive components, as was traditional. Additionally the carts were built using the tools and materials normally available to local artisans and without the use of special tooling or indeed any machining – including drilling.

Several families of cart bodies were developed: wooden framed carts with sides,

steel framed flat bed load trays with and without sides, and steel framed water carrying carts. As part of the cost reduction they also used a novel method of fixing planks to frames and a low-cost, quickly-installed brake system. Fixed axles were tested extensively and a family of novel twin offset axles using plastic water pipe, wood, scrap ball and ball lace bearings developed. The ball race twin axle design was particularly useful allowing low- friction and low-wear axles to be constructed and repaired easily.

Along with axles a novel wheel building method was tried which allowed construction with small steel sections without hammering. Donkey harnesses were also made, particularly to work with carts with single draw-poles. The DTU saddle system, though expensive worked for the special case applied by users in several localities.

The DTU carts placed with users continue to be monitored for longer-term performance records. Some of the ingenious, axle, bearing and body design attributes of the DTU carts have also been adopted by participating artisans, who have continued local manufacture of the carts well after the highly participatory DTU cart project ended. In many cases the designs have been modified to fit the needs of various users, such as metallic wheels, higher clearance for hilly and rocky areas, and collar harnessing.

Gender issues in animal traction and rural transport: Experiences of South Sudan, Zambia and Uganda

Presented by R. Mofya

*Palabana Farm Power & Mechanization Centre,
Woodland, Lusaka*

The presenter first explained the need for including gender analysis in any developmental plans. Gender in any development recognizes the roles played by both men and women, considering their

different interests and capabilities. Unlike welfare approach that concentrates only on the reproductive role of women, gender approach recognizes both reproductive (including all domestic activities such as preparation of food) and productive (including food production) roles.

Animal traction is concerned with reducing the workload for women. Women constitute the majority of farmers in Africa and should be the first target of an innovation such as animal traction. In this regard, it becomes necessary to investigate various issues raised, and the progress, if any, that has so far been made in various countries. Experiences of Zambia, South Sudan and Uganda were presented to elaborate on how development interventions have facilitated women's accessibility to animal draft technology and training. The constraints encountered and recommended strategies for improvements were also discussed.

In conclusion, Ms Mofya reviewed some concerted efforts to address gender issues in ADP in the region. Training for women has been seriously addressed through training sessions with special recruitment of female staff followed by provision of implements to ensure that women learn the acquired skills like to control the implement. Such an approach has been emulated by many development organizations and government institutions concerned with animal traction. Besides, the introduction of donkeys has been strongly advocated as a manageable tool for women to assist in both domestic transport and agricultural operations. Research in DAP technology should be geared towards strong gender considerations to cover the silent needs of women farmers. There is need to study the socio-economic and socio-cultural situations of women and ADP as a base for future intervention.

Supply and distribution of animal drawn implements in the region: Experiences of Zimplot

Presented by T. Lourenco, W. Chipepera and M. McMaster

Zimplot Limited, Bulawayo, Zimbabwe and Maxim Trading Enterprises, South Africa

The presenters highlighted the role of Zimplot (of Zimbabwe), manufacturers of animal drawn implements in meeting the demand for equipment in the region. Maxim Trading Enterprises is the Zimplot agent and distributor of Mealie Brand animal drawn products in South Africa.

The presenters discussed the issues related to the need to expose agricultural extension services and animal traction to smallscale farmers. They highlighted the importance of distribution and availability of animal drawn implements and related spare parts in both urban and rural areas of the region. Participation with Departments of Agriculture, Agriculture Research Council (ARC) and at SANAT workshops, field days and demonstrations promoting animal traction had presented opportunities for Zimplot to get feedback and learn from users. They reiterated that Zimplot could assure users of quality products, spare parts and services.

The presenters expressed their delight over attending the ATNESA workshop and were happy to hear from the users and their supporters. In turn the audience thanked the manufacturers for being persistent in providing support for equipment and its use in the region.

2.4 Animal welfare, nutrition and management

Strategies for improving the effectiveness of crop residues as supplementary feeds for working cattle in semi-arid regions

Presented by S. Israel



*Centre for Tropical Veterinary Medicine,
University of Edinburgh Midlothian, Scotland
UK*

Mr. Israel started his presentation by explaining that in smallholder crop-livestock systems in many tropical countries, feeding of cattle is one of the major problems that farmers experience. The quality of grazing in these areas is mostly poor and due to pressure from growing human populations the area available for livestock is decreasing. More land becomes committed to crop production and less to grazing areas. Under these systems, farmers often do not have enough food resources for their animals during the long dry season.

He continued by saying that on these farms ploughing takes place during the end of the dry season when feed supplies are low and that the work performance of cattle is likely to be impaired, unless some measures are taken to alleviate livestock food shortages. One strategy that the farmers could adopt is to set aside crop residues for feeding their working animals during work. However feeding quality of most crop residues is so poor that animals cannot derive enough nutrients for maintenance, let alone for work. In addition, once the residues are stored, it is likely that quality will deteriorate even further.

Two experiments had been conducted. The first experiment explored whether there was any difference between supplementing working oxen both before and during work or during work alone. It consisted of two treatments namely:

- i) supplementation for 6 weeks before beginning to work and 6 weeks while

- working; and
- ii) the same supplements, but offered during work at twice the amount given in the first treatment.



Animals in both treatments were subject to the same work load and their work output, weight changes and feed consumption were recorded. The second experiment looked at the improvement of maize stover as feed for working cattle through supplementation. In this experiment 12 working oxen, maintained on a basal diet of maize stover were assigned to three supplementary treatments namely lucerne, sunflower cake and cob plus grain meal. All animals were subject to the same working load and their intake of stover, work output and body weight changes were monitored.

The results from the first experiment indicated that the animals that were not supplemented before work, initially lost weight when starting to work, but regained the weight when receiving supplemented feed during the work period. They eventually reached a higher live weight at the end of work. The overall differences in work performance between the two groups were not significant, indicating that both strategies were acceptable.

It was further reported that all three supplements in the second experiment seemed to improve the value of maize stover

by preventing weight loss during work. Sunflower cake gave the best results, followed by cob meal. Lucerne showed the least effects in terms of weight gain, consumption of stover and work performance.

Multipurpose use of work animals in smallholder farming systems

Presented by A. Gebre Wold

Ethiopian Agricultural Research Organization, Addis Ababa, Ethiopia

Dr. Gebre Wold noted that rapid increase in human population and densities can be associated with environmental impact hence increased problems for farmers in planning effective resource management strategies. He added that, in response to these driving forces and to improve the efficiency of the available work animal resources, many traditional systems of management needed to change. One of the more obvious challenges in this respect would be towards the application of new management strategies and the utilization of work animals for a number of different tasks and purposes.

The presenter further noted that opportunities existed in the use of female animals for tasks traditionally carried out by male animals and in changes of ownership patterns. This would enable farmers to not only make better use of the available resources but also increase income generation activities from the work-animal sub-system. In addition, improvements needed to be sought in the use of the different work animal species for a range of tasks to reduce idle time. Many other system benefits could be derived through better use of nutrient resources that smallholder farmers have at their disposal. These are such as improvement in the use of manure, the development of feed systems and the optimized use of available biomass production.

The implementation of these types of strategies, however, would depend on the utilization of methodologies that would enable both researchers and development workers to approach the issues in a dynamic, integrated and systematic manner.

Moreover, there is a clear need to improve the delivery of research results to extension workers and their client-farmers, particularly for materials and methodologies that reduce the complexity of interactions.

The presenter concluded by saying that farmers must be allowed to take a more active role in the evaluation of alternative strategies.

Management of draught animals: A welfare and health perspective

Presented by M James

NSPCA Farm Animal Unit, Alberton, South Africa

Ms. James indicated that significant progress had been made in the past four years in South Africa in the field of animal traction and an awareness of the use, importance and necessity of using cattle and donkeys, horses and mules for draught purposes had been achieved at all levels. However there were a number of constraints that remained.

The presenter started her presentation by defining welfare and health in the sense of animals used for work. She then proceeded to name the five most common and basic requirements of draught animals namely: health, harnessing, nutrition, handling and care. She expanded on this by saying that health and welfare of work animals is fundamental to maximize productivity and well-being and that working animals suffer from the same diseases as other animals. She added that every effort needed to be made, to ensure that the most appropriate animals were used, taking into consideration size, temperament, tractability, adaptability and health. Two other aspects of managing

animals that were highlighted were the importance of hoof care and proper nutrition.

A number of constraints and welfare issues were discussed. These included the local harnessing methods for bovines and equines currently in use. These have relatively small contact area, for both the round withers yoke and the type of breast-band harnesses in use. Inappropriate materials, e.g. wire, and incorrect hitching of the animals to the cart were also common. Stock theft and branding, the ever-present problem of animals on the roads, the possible attacks by predators and injuries, including those sustained from castration, were also discussed.



Community Outreach Projects which focused on improving the welfare of draught animals, and especially equids was recommended, like was education, a suitable goal of such projects.

It was pointed out that and that legal action was only taken in severe cases of deliberate abuse.

Sponsored equine shows and practical demonstrations as means of promoting animal welfare were also recommended.

2.5 Case Study Presentations

Role of information technology in dissemination of draught animal power technologies

Presented by J Swiegers

Editor: Nufarmer and African Entrepreneur, Montana Park. South Africa

Mr Swiegers started his presentation by saying that Information Technologies (IT) should be used to transfer available information to farmers. This would enable them to make use of this information to their full benefit. IT could for instance be used to inform farmers of the advantages and benefits of animal traction and to change the perception of government officials and others who view this technology with reservations. Information on subjects relating to the farming activities can also be passed on.

According to Mr. Swiegers, three main conduits of IT exist in rural terms, namely television, radio and printed media. Though television is visually incomparable in impact, problems such as electricity, signal, time limitations, scheduling and a gap between the presenters and writers, as well as the rural community may make it less of an ideal IT transfer medium. The speaker continued by saying that rural radio is very important these days. A vast number of languages are used to inform the listeners. Unfortunately time scheduling, presentation and the absence of visual pictures may cause problems. He added that printed media may not be as fast as radio and TV but the retention value is a clear advantage.

He raised the importance of being able to supply related subjects e.g. animal traction together with animal welfare and tillage practices.

The speaker named four basic factors that need to be considered when addressing information needs. These are: simple language, structure and logic, brief points and a stimulating subject. The message should also address an exact goal, locate and solve an exact problem and address the right target audience.

Giving South Africa as an example, the speaker noted there are, unfortunately, very few support policies for IT in the development of animal traction. Only a handful of Institutions make use of IT in transferring animal traction information to farmers. As research in developing countries is very expensive, the findings of researchers need to be transferred promptly to the end-users, in order to equip them in time with knowledge, to increase yields or prevent diseases in the current season. IT plays a role in all three phases of technology transfer, namely material, design and capacity transfer.

In closing, the speaker mentioned that studies in countries such as Malaysia, Thailand and Korea have shown that an improvement of computational skills and literacy in primary schools resulted in an increase of 9% in farm yields. This may be the result of the high demand placed on farmer verbal and numeric literacy by the increasing complexity of new farming practices. Children can be taught a love for farming through IT harnessed at schools and through non-formal education.

Work stress and innate resistance of working bulls on two planes of nutrition: Lessons from the N'Dama cattle of West Africa.

Presented by O.O. Akinbamijo

*International Trypanotolerance Centre, Banjul
Gambia*

Dr. Akinbamijo presented an investigation into the effects of nutrition and work on genetic resistance against trypanosomosis in



N'Dama cattle. The researcher had investigated in quantitative terms, the commensurate nutrient allowance, required for the average draft force and routine farm activities in tsetse-infested, semi-arid regions of West Africa.

Major conclusions from the study were based on the fact that improved nutrition, enhanced genetic resistance, higher work output and the ability of infected work bulls to hold body condition and live weight. Further, resting bulls infected with *Trypanosoma congolense* developed a more immediate and intense IgG and IgM antibody response to congopain compared with their working counterparts. Consequently, the study recommended that, although working and resting animals differed in their response to congopain and crude *Trypanosoma congolense* antigen, a work force of up to 7% of live weight and dietary allowance of at least 10 g of digestible organic matter intake per kg live weight would support the effective expression of trypanotolerance of N'Dama cattle working under semi-arid conditions.

Challenges of Animal Traction in the 21st Century: Experiences of various projects in Namibia

Presented by P. Talavera

NOLIDEP Namibia

A case study of the introduction of implements for animal traction by Dr. Talavera in the North Central Division (NCD) of Namibia highlighted the importance of an integrated and participatory approach to the introduction of animal traction technologies.

Dr. Talavera stated that Participatory Rural Appraisal surveys conducted in the NCD of Namibia in 1995 indicated that weeding was a major constraint. The introduction of animal drawn weeders was suggested as a possible solution. Initial farmers' opinions were obtained on this proposed solution and

farmers responded very positively and were enthusiastic about the new innovation.

Various constraints were however identified when introducing the cultivators. These included weakness of animals, absence of cattle on some farms (only donkeys available), poor ability of animals to work and diseases.

In order to tackle these problems, various solutions were identified by on-farm research. These included testing of various implements, especially lightweight equipment for weak animals, training of farmers and animals, testing of various supplementary feeds for draught animals and tests to tackle diseases such as worm and liver fluke infections. While working on the various solutions, a number of new constraints which needed to be researched emerged. These included amongst others, the effect of systematic ploughing of fields on the soil condition, the effect of weeding on weed pressure and weed species and the selection of cowpea species.

Extension messages on the use of implements (ploughs and cultivators) and veterinary drugs were prepared and successfully taken to the farmers. New problems arose from this action, however. Local businesses were reluctant to take up stocking and selling of the implements and spare parts due to the lack of a definite demand from farmers. Veterinary drugs were also only available in the main centres and not in rural areas where farmers could easily access them.

In closing, Dr. Talavera mentioned valuable lessons that were learned from this project. These were: that the approach has to be participatory to ensure that farmers are involved in the process from an early stage, in an integrated approach taking into account aspects such as livestock production, soil condition, economics and agro-ecological aspects. The approach has to be multi-disciplinary, including agronomists, veterinarians, livestock production specialists, researchers, engineers, trainers and social scientists.

3. Field visit and on-farm demonstrations

Like has become traditional and the highest valued component of ATNESA workshops, a whole day of the five-day workshop was spent interacting with farmers, transporters and other animal power users and their development supporters. On Wednesday, the mid-workshop period, in the early part of the morning, farmers in different parts of Mpumalanga province were visited and interviewed informally by small groups of workshop participants.

In the interviews a checklist of issues, drawn from workshop objectives and discussions was used. The issues captured were as broad as the range of subjects that had

already arisen from the plenary sessions. The arising issues were made real by scaling them down and making them specific to the needs of the various users

visited. These and more issues would be used in action planning for the "way forward" later in the week, for not only South Africa but also the region in general.

The participants definitely learnt how South African animal traction programmes could

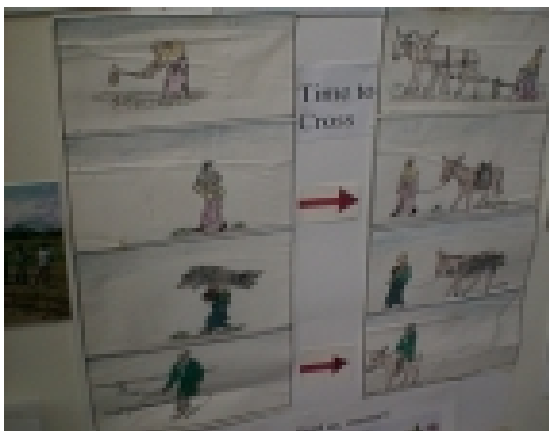


gain from their experiences and learnt from what they saw just as much. Field visits ended with a farmers' field day organized by government officials and the SANAT secretariat. Implements, tillage practices, harnessing of donkeys, and the use of cows for traction and primary animal health care were demonstrated. For more effective networking, a joint luncheon was held for farmers, government officials and workshop participants. Fruitful discussions were held and lessons learnt from the contact with animal power users and industrialists. Arising issues were later analyzed in small workshop group discussions and added value to the workshop synthesis, as well as the final action planning.



4. Poster presentations

Again and as has become traditional for ATNESA workshops, several posters were displayed in the main conference room during the workshop. The following is a brief about some of the displays:



Animal Traction Development and University of Reading

Empowering farmers through animal traction, worldwide trends, issues and challenges. Numerous photographs portraying animal traction utilization all over the world were displayed. Participants had the opportunity to see different ways in which farmers and other users benefit from animal traction in different parts of the world. Interesting concepts and ideas on how problems relating to animal traction are solved in other countries were put across visually.

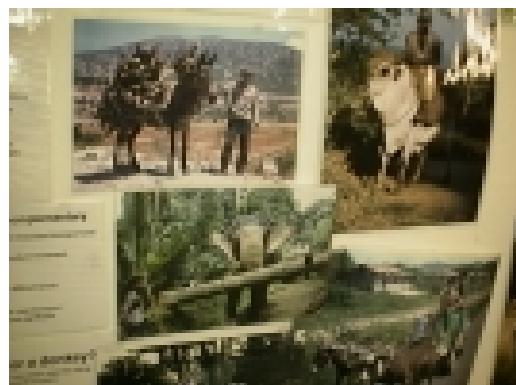
Dr Peta Jones

A very interesting display of photographs of donkeys with equipment for packing (backloading). Participants had the opportunity to get to know real life solutions for real life problems in as far as donkey harnessing and transport is concerned. A manual on almost all aspects of donkey management was also displayed and sold to interested participants.

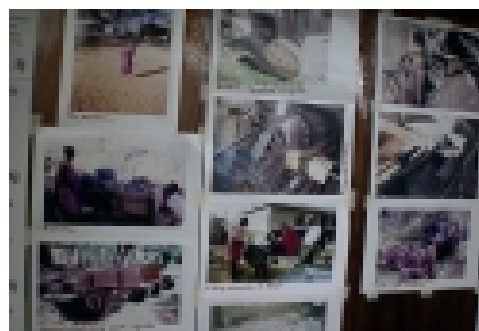
DMA/IAV Hassan II

The use of animal traction in Morocco was strikingly displayed by this set of posters.

International Trypanotolerance Centre



This poster highlighted the work done at this Centre on the influence of work stress and the innate resistance of working N'Dama cattle of West Africa, to the effect of Trypanosomiasis. Detailed graphs and tables explained the difference in reaction to Trypanosomiasis infection between working and resting cattle, on two planes of nutrition.



Heifer Project International: Zambia

The poster displayed by this project won the prize for best poster presentation. Full colour photographs and text were used to explain the involvement of the Heifer Project International in Zambia.

ARC Institute for Agricultural Engineering

Posters highlighting the current status of animal traction in South Africa, together

with a few probing questions were put up to inform participants of the reality of animal traction in South Africa

University of Edinburgh: CTVM

The "Draught Animal News" a DFID funded-publication which covers a whole range of aspects concerning animal traction, and other publications on draught animals which are available from CTVM were displayed. Material on the courses offered by CTVM were also displayed.

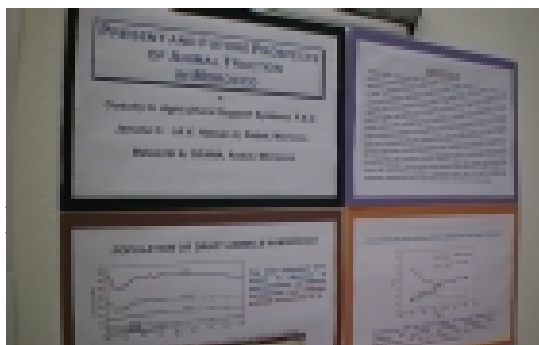
Development Technology Unit: University of Warwick

A number of posters on cart and bearing design as well as a working model of a cart were displayed. Principles behind the design of simple lightweight carts, cheap, efficient bearings and a braking system were highlighted. Experiences from working in Kenya, Uganda and Ethiopia were shared.



ARC Animal Improvement Institute

These posters described the work being conducted by the Research Institute of the Agricultural Research Council on the improvement of cattle such as the Nguni and Afrikaner breeds for animal traction purposes. Future work that is being planned



such as draft force requirement measurements and feed requirements were also described.

Animal Traction Centre of University of Fort Hare

A number of harnesses belonging to the ATC were displayed in the main conference centre. This gave participants a chance to look at good quality, well made harnesses, including a harness made without using any buckles as well as four posters labelled: "The Fort Hare Animal Traction Centre", "The Golovan Ox-Cart", "Mechanizing Small Scale Agriculture with Animal Traction" and "Mechanizing Agriculture using Animal Traction and Small Scale Irrigation".

IMAG-DLO/SAMeP

The networking activities as well as the integrated approach to development of this Dutch programme in Mali, Zambia and South Africa were highlighted by this poster. It also put the emphasis on, on-farm product development.

Musokatanda Agriculture and Family Health

This poster described the work being done by the Musokatanda Agriculture and Family Health project in the Congo. The project focuses on family health, and nutritional and economic problems through training in agriculture, community organisation and the application of appropriate and affordable technologies.



Palabana Farm Power and Mechanisation Centre

An interesting picture story indicating the various uses of the donkey was displayed. The theme captured the developmental transition, crossing from hand power to animal power, especially donkeys. The activities of Palabana were also highlighted.

Equipment displays

A number of animal drawn implements such as a lightweight plough, a ripper, a ripper-planter unit, harrows and a special donkey cart were exhibited outside the main conference room. Round yokes as used in Southern Africa for ploughing and planting or weeding were also on display.

5. Informal evening sessions

Work in Southern Sudan

A very interesting slide show was presented by Dr. Elizabeth Waithanji. They captured her experiences as a veterinarian in Southern Sudan, where she was facilitating implementation of a community based veterinary programme and training para-veterinarians for Oxfam GB.

Heifer Project International- Zambia

Ms N. Mwenda showed a video, informing participants of the activities of the Heifer Project in Zambia. The project entails the distribution of cattle for draught and non-draught purposes.

Camel research

The preliminary findings of work which was carried out by Prof. Girma Gebresenbet of Swedish University of Agricultural Sciences (SLU), Dr. P. Kaumbutho of KENDAT, and Dr. Piers Simpkin of FARM Africa on the power capacity and endurance of draught camels was discussed. Slide pictures highlighting the practicalities of research as it was conducted to measure power output of camels were shown. Physiological parameters such as heartbeat and pull forces were measured using state of the art electronic equipment.

Conservation tillage discussion group

A group of participants interested in conservation tillage got together to discuss the formation of a conservation tillage network for Eastern and Southern Africa. Plans for this venture were at an advanced stage as a follow-up of various previous meetings on the subject.

Donkey harnessing

Different types of donkey harnesses as well as different hitching systems were discussed at length. Problems particular to harnessing donkeys as well as advantages and disadvantages of possible solutions were taken into consideration in trying to come up with a suitable harness for donkeys.

Veterinary discussion group

A number of veterinarians got together to discuss aspects surrounding the delivery of veterinary services. During initial discussions the following points were perceived to be of interest or concern to those attending the meeting:

- Privatisation of veterinary services
- Access of small-scale farmers to health care for their livestock
- Primary animal health care training, including preventive medicine
- Emphasizing the importance of good animal management, particularly feeding
- Animal welfare
- Use of traditional remedies and indigenous knowledge
- The risk of increased diseases due to intensification of livestock production
- Encouraging increased productivity of livestock (for meat, milk, draft power, wool etc.)
- Veterinary public health (safe food)

An overview was given on the animal health situation in each of the countries represented. Minutes of this meeting are available and are included in the Workshop Proceedings.

6. Networking pronouncements and country reports

At this special plenary session of the workshop, all the countries represented, (whether ATNESA-countries or not) were given a chance to make a report about the animal traction activities going on in their countries. Work and activity reports were received from some 14 countries. Each country's presenter was requested to introduce national colleagues, of which it was apparent that networking in the region has rendered some participants "homeless", with their jobs that keep them working anywhere in the region.

The activities captured were formal, informal, government, non-government, user or project based. The sharing that resulted from the presentations was most rewarding as participants realized how much was going on, common problems and indeed how much there was to be done in developing animal traction to centre-stage. The learning that took place saw participants comfortable and seated to a time, way after scheduled dinner time! The region truly came in as a reachable and supportable small section of the globe. The powers of networking came alive for real.

Some countries were thorough enough to submit voluntary written reports, which are summarized below:

Congo

This report was given by *Musokatanda Agriculture and Family Health Project*. The Musokatanda project addresses family health, nutritional and economic problems through training in agriculture, community organization and the application of appropriate and affordable technologies such as animal traction.

A farmer's cooperative was organized to increase the staple food production and to

help the introduction of animal traction. The animals (3 pairs of oxen) on the project farm are used for ploughing, harrowing, planting, cultivating, brick making, peanut lifting, and transport. This is an invaluable power source in a country where there is a shortage of fuel, spares and the capital necessary for high input agriculture. Production in project areas has greatly increased due to the use of animal power.

The development of an animal powered cane crusher and silage chopper is in the pipeline. The animals are also used to plough during the dry season. This has the benefit of using available labour when it is not needed elsewhere.

Good quality implements are not readily available, and lightweight, strong carts and wagons are difficult to obtain. There is also a great need for donkey harnesses and animal breeders could look into breeding stronger donkeys. Multi-purpose animals will be of great value.

Eritrea

Their report was given by the Eritrean representative at the Workshop. He reported that animal traction has been used in Eritrea for thousands of years and animals are the most common power source for agricultural activities and the transportation of people, wood and water. In the highland areas of Eritrea, oxen are mainly used for cultivation while donkeys are used for transport. Horses are used for transport in the urban areas. In the lowlands, ploughing and transportation is done by donkeys and camels.

Although animals are the main power source for agricultural activities, very little has been done on the development of appropriate implements. The new government is trying

to develop the use of animal traction and agriculture in general. One of its priorities is to develop the human resources in areas of animal husbandry and mechanization in order to study the current potential and to develop new devices for the effective use of animals in power supply as well as animal products.

Networking, technology development and research centres still need to be developed in Eritrea, but as a general policy of government, every sector of agriculture, including animal traction will receive priority.

Malawi

This report was given by *Wells Kumwenda of Chitedzi Research Station*. He noted that the agricultural farming scene in Malawi is divided into two sectors, the smallholder and the estate (large scale) farming sector. The smallholder sector has scattered family holdings on small pieces of land. The smallholder farms provide 85% of the food crops grown in Malawi. The estate farms are much bigger and farmers usually have access to cash and technical know-how.

According to a study conducted in 1995, Malawi has approximately 56,000 oxen, 21,000 ploughs, 15,300 ridgers, 734 cultivators and 17,400 ox-carts in use.

Some of the problems regarding animal traction in Malawi are:

- the high number of unused implements,
- duties paid on imported raw material, hence high cost of manufacture and final price,
- a lack of suitable draught animals,
- lack of willingness of traders to stock animal traction implements due to seasonal nature of demand,
- poor availability of spares in rural areas
- a lack of a clear policy on mechanisation.

A number of actions planned for the future will help to alleviate some of these

problems. These include training of farmers and artisans, better nutrition of working animals, cheaper carts and implements, research on and treatment of diseases and pests, promotion of appropriate implements for weeding and conservation tillage and animal multiplication centres. A national policy on mechanisation, developed in cooperation with the FAO has recently been accepted.

Tanzania

This report was given by *Saidi Mkomwa: TADAP Secretary General*. He noted that the use of draft animal power in Tanzania is on the increase, though at a slow rate. Farmers using animal traction for ploughing (especially in the lake zone) are slowly being exposed to and adopting animal drawn weeders. There are also other areas such as Morogoro and Ruvuma where animal traction is being introduced and attaining acceptable success. Low farm incomes due to poor yields and low producer prices during the past two years have significantly reduced capacity for farmers to acquire replacement implements and spares.

Less than 20% of Tanzania's estimated 40 million ha of cultivable land is currently being cropped. Of this, 70% is cultivated by hand, 20% by animals and 10% by tractors. There are more than 13 million cattle and 250 000 donkeys in Tanzania of which only about 1 million cattle and 20 000 donkeys are used for animal traction. The Tanzania Government policy openly supports animal traction but very little is done at ground level to promote the use of animal traction. On the other hand, vast resources have been wasted on inappropriate approaches or technology packages. The main transfer of animal traction knowledge remains farmer to farmer extension with the exception of a few development projects. This has affected the adoption of newer technologies such as weeding and ripping negatively. More than 95% of the working animals in Tanzania are oxen, the rest being bulls and cows. The use of donkeys is increasing and

these are popular with women and resource poor farmers. Donkeys are increasingly being used for the transportation of wood, water and cereals as they can easily be handled by women and children. Cows are used for draft purposes in isolated pockets (Makanya ward of Kilimanjaro region).

Some farmers in the Ufipia plateau of the Sumbawanga district and the Makambako ward of the Njombe district are increasingly keeping only oxen. The price of oxen in these areas is much higher and problems in obtaining replacement stock have started to surface.

The Uyole Agricultural Research Institute (ARI) is undertaking research in weeding and conservation tillage. The Ukiriguru ARI undertakes research in animal traction on a farming systems and client oriented approach. Collaborative research is also undertaken with local manufacturers and development projects on rice field puddlers, single animal harnesses and cotton ripper-planters.

Though the government extension service is well organized, it is ineffective in transferring animal traction technology. Interventions by development projects and NGOs like COOPIBO Tanzania, OXFAM, INADES, CARE, IFAD, FAO and the Dutch funded projects has been a viable options for introducing animal traction to areas of non-use or newer animal traction technologies.

Networking of animal traction activities in the country is undertaken by the Tanzania Association for Draft Animal Power (TADAP) which is affiliated to ATNESA. The goal is to eventually coordinate all animal traction activities in the country.

TADAP has conducted two major workshops, one in 1997 in Shinyanga on the identification, analysis and prioritisation of constraints to the widespread use on animal traction. The second was held in 1999 in Arusha and focused on four projects that

will be pursued by TADAP across the country to assist in increasing the use of draft animals in all stages of production.

Zambia

This report was presented by *Rhoda Mofya of Palabana Farm Power and Mechanisation Centre*. She reported that Animal Traction in Zambia has been used for a long period, especially in the Western and Southern Provinces. The use has over-time spread to Eastern, Northern and North-western Provinces. However, in the beginning of the 90s, there has been continuous reduction in the number of cattle, due to disease out breaks and drought. This has led to increased interest in donkeys.

As a result, there has been an increase in donkey population from an estimated 1000 in 1991 to 3000 in 1996. The move for farmers to use donkeys has been highly encouraged and supported by the government, which imported 96 donkeys from Zimbabwe in 1995.

Palabana Farm Power and Mechanisation Centre, is the National unit for animal draft power development and promotion activities. Since its establishment in 1988, the centre has been in the forefront towards development of animal traction technologies, training of farmers' extension agents and promotion activities. The centre has produced many publications, which include articles such as national surveys, research reports and extension or promotion messages.

In collaboration with the Ministry headquarters team for Farm Power and Mechanisation, under the umbrella of the Agricultural Sector Investment Program (ASIP), Palabana co-ordinates networking on ADP issues with other collaborating partners at both local and international levels. Through ASIP, private sector and NGO participation is being encouraged to enhance promotion of ADP technologies.

Recent developments include identification of specific roles for government, private sector and NGOs in the promotion of ADP. The government, in this regard facilitates development of private-sector agricultural equipment manufacture, rural retail and agribusiness initiatives.

The private sector (SAMS, SARO AFE and others) cover manufacturing, distribution and marketing of implements. A number of NGOs such as SAMeP, Heifer International, Women in Agriculture amongst others are also involved in the dissemination of information, marketing, manufacturing as pilot activities, and the supply of draft animals through community based organisations.

Botswana

This report was given by *Cecil Patrick Botswana College of Agriculture*. He reported that Botswana is mostly semi-arid (300-400mm rainfall) with uneven rainfall. More than 70% (1.3 million) of the people derive their livelihood from livestock and crop production. 3 to 5 million ha out of 60 million ha is used for crop production. Field sizes range between 5ha for traditional farming and 1000ha for commercial farming.

The major crops include sorghum, maize, millet, cowpeas and melons, in order of priority. The agricultural mechanisation scene is still dominated by animal traction for which 3 million cattle, and 230 000 donkeys are used. In 1990 there were about 6000 tractors available (1990). Government schemes were responsible for the increase in tractors, which were made available through government schemes. A number of programmes are run in Botswana, which include Arable Lands Development Project for animal draft power and machinery acquisition, Accelerated Rainfed Arable Programme for paying of ploughing costs and Drought Schemes through which ploughing costs are paid when government declares a drought year.

Most farm operations are carried out by hand or animal power. The number of oxen used for work as well as the number of tractors available are decreasing while the number of donkeys is increasing.

There is no established animal draft power network in place in Botswana but different institutions often meet to discuss common issues in the agricultural machinery business. Informal links between officials also exist and collaborative research is encouraged.

The Institutions that are interested in animal traction are the Department of crop production and forestry, the Department of agricultural research, the Botswana College of agriculture, the Rural Industries Innovation Centre, various NGO's and farmers.

Kenya

This report was presented by P. G. Kaumbutho, Executive coordinator of KENDAT. He reported that KENDAT was registered in Kenya as an NGO and launched back in 1992. KENDAT migrated from its old home at the Department of Agricultural Engineering, University of Nairobi to its own premises among users in Kikuyu, some 30 kilometres from Nairobi. They had seen the move as a "pull down from the ivory tower". Among other advantages of the movement KENDAT headquarters was now an accessible referral centre, available for users and researchers alike.

Apart from conducting a small business with a tillage and transport, oxen and donkeys crew in the Kikuyu and Limuru neighbourhood, KENDAT was now busier manufacturing panniers, harnesses and carts for a wider range of customers. Some of the manufacture is now to stock the new animal power shops cum liaison centres, opened in (Nanyuki and Nyahururu) Laikipia district. Work in Laikipia is supported by the Dutch SARDEP (Semiarid Rural Development Project) under

whom collaborative work in Kajiado and Keiyo Marakwet Districts was being explored.

KENDAT was busy training draft animal power users and was keen to train farmers as trainers and NGO extension workers. The groups so far trained were such as from the Agriculture and Environment Programme (AEP) of the Catholic Parish of Homa Bay and Laikipia District's farmer-trainers who were from 5 Divisions across the district.

KENDAT is in plans towards becoming the sole distributors for East African Foundry Works (EAF) manufactured, animal drawn equipment.

KENDAT has a broad training programme in agricultural mechanization, covering farm management and the systems approach on top of animal traction and its non-traditional subject areas, such as courses for paravets.

It was promised that a prospectus and KENDAT training programme would be availed to all participants of the current workshop among others. KENDAT field work and training in animal traction has a wealth of input, from a wide range of trainers including practicing farmers, artisans and credit managers. The training resource has special input in the area of donkey power utilization. This comes from the collaborative input of the many institutions and individuals available to the network such as the KSPCA who work closely with the International Donkey Protection Trust.

KENDAT has a commercial training farm where all operations in tillage and transport are animal powered. This farm and those of neighbouring farmers are used for training. A specialist Consultancy Company; Development Technology Ventures (DTV) Ltd is available for specialized work often requested in the area of smallholder agricultural development. Project planning, animal power and its broad applications such as in post-harvest operations, water pumping etc. specialist procurement and more are but a few

areas addressed by DTV.

Some other areas of concentrated KENDAT effort currently were reported as:

- Animal drawn conservation tillage research and development with Triple W Engineering the Regional Land Management Unit (RELMA) of SIDA (Swedish International Development Agency) and Kenya Agricultural Research Institute (KARI).
- Networking, equipment supply and consultancy input in guiding the Uganda National Farmers Association (UNFA) and the Uganda Government in animal traction work under the umbrella, "Modernization of Agriculture" initiative.
- Rural transport networking and support as a member of the National Forum Group (NFG) in collaboration with IFRTD, RTTP (World Bank) and others.
- Pastoralists development and camel traction research and development in collaboration with FARM Africa and Swedish University of Agricultural Sciences (SLU). Power measurements and output of various camel breeds at work are being conducted.
- Plans for an East Africa Agricultural Rural Transport (ART) Project to be funded by DFID/NRI and SIDA.

KENDAT contacts are available in this report.

Zimbabwe

This presentation was made by E. Mbanje on behalf of the Zimbabwe network (APNEZ). He noted that the natural evolution of mechanization in the smallholder farming sector in Zimbabwe emanated from the use of a digging stick, and later, simple ox-drawn steel ploughs, small engine powered units and sophisticated machinery on larger community farms. For the majority of smallholder farmers however, the more rapid evolution to more sophisticated machinery such as tractorized equipment might never be realized for various reasons.

To support the costs of a 20 kW tractor which is the minimum power at which a tractor is considered technically feasible, a farmer needs about 40 hectares of well cropped arable land. The average cropping land area of a smallholder farmer in Zimbabwe is only 3 hectares. The land is subdivided into smaller parcels of 0.5 hectares making it more uneconomic to work with a tractor. The high costs, high input, high management skills and supporting infrastructure associated with tractor ownership dispels the option of a tractor as an alternative source of power that can totally phase out animal traction.

Oxen and donkeys are the two main sources of draft power in Zimbabwe. Donkeys have increased in importance, even in tillage due to recurrent droughts.

Traditionally, working with draft animals has always been considered man's responsibility. Urbanization has seen men migrate and leave women to take-up their roles. As a result, women and children have become increasingly involved in working with draft animals.

Some constraints that threaten animal traction in Zimbabwe are such as:

- outbreaks of diseases,
- ill-treatment and mismanagement of draft animals, particularly donkeys,
- mismatch of implements to the available draft animals,

- cultural barriers such as those which bar people from owning donkeys,
- full potential of draft animals not realized due the fact that women shy away from using draft animals and
- inadequate grazing area, a situation made worse by droughts.

Zimbabwe has several support services such as

- the government's veterinary department
- Society for Prevention for Cruelty to Animals (SPCA)
- manufacturers such as ZIMFLOW , researchers, farmers and other interested stakeholders

On the way forward the presenter mentioned that there are plans to develop further activities such as:

Introduction of animal traction studies school curricula

Introducing animal traction to farmers acquiring bigger pieces of land through the resettlement programme

APNEZ was formed in 1994 and has compiled the findings of a national diagnostic survey of power availability at farm level and a data base with contacts of key people, companies and other stakeholders that are involved in animal traction in the country.

A Library is available with key information. APNEZ also houses and gains from the ATNESA Secretariat and the networking it provides.

7. Workshop synthesis and summary of workshop discussions

The following are the main summary points which came out the ATNESA/SANAT Workshop as derived from the participatory group discussions which followed the plenary sessions. For ease of reference they have been summarized according to appropriate topics.

Implements and tillage issues

- Do we need a lighter plough ?
- How can we promote improvements in the quality of locally-produced implements?
- However, we must also remember the role of tractors, positive as well as negative, and whether or not they can be improved for the small-scale farmer. If so, how ? Complementarity should not be ignored either.
- Appropriateness and proper setting of implements can impact on their effectiveness; should we think of improving rather than re-designing.
- Need to look at imports, especially those of poor quality and their impact on local users and manufacturers.
- The sourcing and appropriateness of materials may need to be reconsidered.
- Harnessing is still a problem for most users.
- What effects will the 'recycling' policy in Europe have in the supply of spares & tyres in Africa?
- Should we be reinventing the wheel - or strengthening the support services? Bicycles and trucks can be maintained in villages; why not carts?

Environment issues

- Do donkeys really make a significant contribution to habitat destruction? How do they compare with cattle (apart from

living longer)?

- Need to be clear about Contil: when to use herbicides, when to use cover crops.
- In conservation tillage/water management the most exciting water harvesting techniques seem to be runoff capture to get over dry spells in the rainy season especially when they occur at times of crucial development of the plants.
- In reduced tillage impact can be through reducing the number of times an operation is done, rather than changing the practice altogether (e.g. land preparation for tef in Ethiopia).
- New multipurpose plants, such as 'bana' grass used to improve soils, also make good silage.
- If farmers see soil fertility as a problem, do they use manure and crop residues? If crop residues are part of animal nutrition, this could be a problem.

Economic issues

- How can we get bankers and farmers together?
- Where subsidies are concerned, elimination would not be a good idea at present. Since most farmers and entrepreneurs have limited resources, they benefit from a 'kick start' subsidy with clear entry and exit points. But these subsidies should be considered location specific.
- There is need to examine & identify when credit can promote DAP and its effectiveness in different situations.
- Should we leave manufacturers to do everything: manufacture, promote etc., (which they may not afford) or should extension services come in so that manufacturers can concentrate on making good quality equipment?

- Price is a problem with manufacture: what people can afford to buy can be different from what they want. Can we bridge the price gap?
- Manufacturers are receptive to innovative ideas. We could consider how a link between researchers and manufacturers can be promoted, to the benefit of both as well as users.
- In South Africa the potential for animal-powered forestry enterprises and logging by small-scale contractors needs to be exposed and developed.
- We must not assume that hand-weeding is unproductive.

Welfare and nutrition issues

- Timing of work with respect to eating is important, especially for donkeys for which, day-before or month-before nutrition is not enough; they must eat directly before working.
- The storage of high-quality forage is still a problem; utilization of silage helps. Millet straw treated with urea is one known strategy for cattle.
- Types and breeds of cows for multipurpose use in various situations need to be understood to minimize negative effects of work on milk production and calving intervals.
- Need to understand impact of diseases on the different draught species in an area. Some areas (e.g. humid ones) may enable cattle to survive better than donkeys, and the opposite for others, depending on disease profile. Stressed animals always fare worse.
- Use of cows so that reproduction demands do not compete with demand for work is different when breeding is not controlled as on communal lands. So management practices must make sure that peak time of work and reproductive demands do not clash.
- Feeding the multipurpose animal requires supplementation.
- The type of basal feed available will determine when it is fed in relation to

work and rest periods. This means different messages for different areas should be produced, depending on whether animals are on grazing or cut-and-carry systems.

- Could understand work/disease interactions more fully, and widen the scope to other diseases than trypanosomosis.

Image, participation and transfer of technology

- Must not generalize, but consider individual situations when looking at interventions and innovations.
- Message must be appropriate to audience and situation.
- Must not ignore politicians or farmers, but need to consider how to improve image of DAP and confront myths.
- Sitting arrangements are important, and the involvement of local leadership structures.
- Gender issues are changing. Is there an economic incentive to overcome/ignore taboos/myths if only temporarily?
- The role of elders as guardians of traditional DAP knowledge could be important.
- How can we access ITK? Having done this, what do we do next? Cataloguing methods are only the start.
- Generalizing in gender issues can be dangerous: tasks can be interchanged when the need arises and in future a blurring of the edges is likely to occur as women and men share activities (not necessarily doing them together).
- Holistic training is the way ahead. Train the men not to let the donkeys stray; train the neighbour not to kill or damage the donkey when it strays, but chase it back to the owner.
- Different media are appropriate to different countries and situations. Rural farmers are often accessed through their children, and thus through schools.
- The printed word is the more permanent form of promotion, so can have wider

and longer lasting effect, than TV or radio, for example.

- Training is important in Empowering farmers through Animal Traction.

8. Workshop recommendations and follow-up

Deliberations at the ATNESA/SANAT International Workshop and 3rd General Assembly saw some excellent and down-to-earth presentations capturing a wide range of professional and other experience in rural development. The wealth of the range of disciplines and countries present naturally led to new-look discussions on recurrent as well as new issues in specific localities of the in-homogenous Eastern and Southern Africa region and beyond. This in turn led to a special enrichment of the South African participants and particularly so, the farmers and field workers. South Africa has previously missed out on the learning that could have been brought by interaction with the rest of the continent. This is particularly true for those in smallholder agriculture. Special interaction came through field visits and the demonstrations.

Action plans with realistic definition of scope and timeline were proposed by interest groups, merged and discussed in plenary session. Special issue considerations were also highlighted. Both of these are presented here, with timelines presented in brackets where applicable. Participants volunteered to carry out different aspects of the action plans. Where external funding will be required, actions will be effected subject to availability of funds. Cross-cutting tasks were given first priority. Other tasks were assessed and those that participants had capacity to accomplish were taken up and are presented as “Realistic Action Plan”.

Policy

1. Lobbying
 - Get senior government officials to attend field-days in order to get first-hand input about the needs of users and the role of animal traction.
 - Include and involve donors and influential others in e.g. district level and national tillage and rural transport competitions, prize giving days with media coverage.
2. Collaborate with other networks and forums to create a “critical mass” to organize events.
3. Work towards forming a funded national coordinating unit within government structure to stimulate national training, extension policy etc. Justification being, “past neglect, present ignorance and future importance of animal traction”.
4. Identify end -user felt needs in areas and domains where there exists development funding and influence interventions towards meeting these needs.
5. Identify attractive and positive-image activities and disseminate information on benefits of animal traction use to influence policy makers e.g. pamphlets, posters and calendars.

Socio-economics

1. Where it has not been done, identify, document and disseminate information on ‘user - felt’ needs through participatory methodologies including gender analysis. Publicize and service

these needs through networking activities e.g. workshops involving all stakeholders and especially farmers.

2. Carry out studies, document and disseminate findings on good and bad credit experiences. Develop guidelines on feasible credit schemes in collaboration with existing credit organizations and their beneficiaries. Potential partners might be NGO's and international organizations.
3. Carry out a survey on the image problem and how to address it. In the meantime, develop youth oriented publicity posters, cartoons, video, primary school books, T-shirts, competitions, etc.
4. Quantify, document and disseminate social and economic costs and benefits of animal traction identified through studies and workshops.
5. Monitor, evaluate and assess the impact of ATNESA past activities on end users. Based on the findings, develop guidelines and a strategic plan for future interventions.
6. Establish an ATNESA web-site with a page for each nation, strengthen national and regional secretariats (perhaps in collaboration with other related organizations) and improve contributions to networking newspapers e.g. *SANAT Newsletter*, *Draught Animal News*, *The Rural Livelihoods* of KENDAT etc.
7. Publicise activities related to animal traction participatory techniques at national and regional levels (for example articles in SANAT/ATNESA Newsletter and web-site).

Technology

I. Commercially available animal traction technologies

1. ATNESA to assist national networks in compiling an electronic and paper catalogue of commercially available products and retail suppliers.
2. ATNESA and/or other organizations to become a legal entity to promote animal traction as KENDAT in Kenya or ZIMTRADE in Zimbabwe.
3. ATNESA to compile and communicate trade fairs / agricultural shows and demonstration lists with other national networks in the region.

II. Novel but under-developed animal traction technologies

1. Inventory of new designs, products and on-going research activities to be published on ATNESA web-site and on paper.
2. Dissemination of above inventory to national networks.
3. Electronic and other exchange of drawings of products.

III. Animal traction technologies for small and medium enterprises (SME's)

1. Facilitate training of artisans/ fabricators through existing national agricultural extension services (AGRITEX, SAMEP etc.).
2. Generate suggestions for new products for local/ SME production.
3. Develop guidelines for national networks/ organizations for practical support of SMEs (relevant products).
4. Lobby governments/authorities for lower import duty on materials and components.

Animal issues

1. Establishment of a web-site by September 2000.
2. Produce a directory of members/interested parties in DAP by June 2000.
3. Develop guidelines on training of trainers for extensionists (participatory methods) by the end of 2000.
4. Develop training packages which are national networks based on participatory methods by end of 2001.
5. Guidelines on training paravets and farmers by the end of 2000.
6. National networks to identify other institutions that (could) link up with the ATNESA by June 2000.
7. National networks to promote collaboration programmes with other institutions by 2004.
8. Collate existing information on Ethnoveterinary Practices and Indigenous Knowledge (IK) by the end of 2000.
9. Evaluate promising EV/IK practices by 2000.
10. Evaluate recommendations on DAP feeding on-farm.
11. Lobby institutions/organizations involved in livestock breeding to consider work-animal traits in their programmes by 2004 (on-going).
12. Quantify reproductive indices of donkeys in different situations e.g. work and non-work, draught, transport, environment by 2004.
13. Recommend to policy makers and other bodies/institutions, the inclusion of DAP in their plans by June 2000.

Realistic action plan

1. ATNESA web-site established.
Establish an ATNESA web-site with a page for each nation, strengthen national and regional secretariats (perhaps in collaboration with other related organizations) and improve contributions to networking newspapers e.g. SANAT, Draught Animal News etc. (C. Oram and G. Gebresenbet by September 2000).
2. Directory of members/interested parties and where possible a brief data base on their areas of interest and specialization (P. Starkey, E. Nengomasha, SANAT and P. Jones by June 2000).
3. Produce and circulate addresses of workshop participants and produce workshop report (Workshop secretariat, immediately).
4. Guidelines on workshop courses on animal traction e.g. training of trainers for extensionists (participatory methods) (J. Turton, SANAT, E. Mwenya, E. Waithanji and GTZ - Zambia by end of 2000).
5. AT training packages (SANAT, P. Jones, R. Shetto, Palabana and national networks).
6. Collate existing information on Ethnoveterinary Practices and Indigenous Knowledge (IK) and Evaluate promising EV/IK practices (J. Turton, A. Maltick, A. Lewa and P. Talavera by the end of 2000).
7. Evaluate ongoing (on farm) feeding strategies (L. Ndlovu, A. Pearson, E. Waithanji and national networks - long term).
8. Donkey reproduction - Quantify reproductive indices of donkeys in different situations e.g. work/non-work,

- draught, transport, environment (A. Pearson, L. Ndlovu and G.W. Alemu by 2004).
9. Curricula be developed and used to beef up campaigns in our schools, and agricultural colleges. (National networks to set up a dialogue with policy makers and educational institutions to facilitate inclusion of DAP in their curricula. Initiated by June 2000).
 10. Lobbying and advocacy for a positive image of animal traction. Carry out a study on the image problem and how to address it. In the meantime, develop youth oriented publicity posters, cartoons, video, primary school books, T-shirts, competitions, etc. (W. Kumwenda, E. Namalambo, National networks and individuals long term campaign).
 11. Carry out studies, document and disseminate findings on good and bad credit experiences. Develop guidelines on feasible credit schemes in collaboration with credit organizations and their beneficiaries. NGO's and International organization partners. (S. Musa, KENDAT, CIRAD and M. Makaota)
 12. Cost - benefit analysis. Quantify, document and disseminate social and economic costs and benefits of animal traction identified through studies and workshops (Palabana, L. Ndlovu, KENDAT, University of Fort Hare and P. Webster.
 13. Develop guidelines on how to keep farmers actively involved in Networks (TADAP, KENDAT, E. Waithanji, GTZ - Khatu).
 14. Investigate ways in which different hitching practices affect performance of different animals. (Bertha Mudamburi; part of her ongoing research).
 15. Monitor, evaluate and assess impact of ATNESA past activities on end users. Based on findings, develop guidelines for future interventions. (Kumwenda, Steering Committee to get an external evaluator).
 16. Inventory of new designs, products and on-going research activities to be published on ATNESA web-site and on paper. (IMAG, National networks, Palabana, ARC, Mbanje, ENAP/ENAT - Melesse, Nazaret, CIRAD, RELATA)
 17. Catalogue - electronic and paper exchange of SME information of products and drawings (C. Oram, M. Saidi, IMAG and Palabana to start with Zambia, Wanders, Stevens, Mbanje)
 18. Develop guidelines for national networks/organizations for practical support of SMEs (relevant products, IMAG, Nazaret).
 19. Information on fairs, demonstrations and other Image improving activities to be fed to Draught Animal News and SANAT Newsletter. Plan an ATNESA fair? (National networks).

9. Third ATNESA General Assembly

The ATNESA/SANAT workshop was an important gathering as it hosted the third General Assembly (GA) of ATNESA. The first GA was held in Lusaka in 1992, and the second in Nairobi in 1995. The third general assembly of ATNESA was held on Thursday 23 September, 1999. The meeting started at 16:00 hours and adopted the following agenda:

- ◆ Welcoming remarks
- ◆ ATNESA activities report
- ◆ Treasurer's report
- ◆ Amendment of the Statutes
- ◆ Election of new steering committee
- ◆ AOB

The outgoing chairperson, Prof. T E Simalenga welcomed participants and noted that for the first time in ATNESA gatherings, all 15 ATNESA-region countries were represented.

The ATNESA report was then presented, highlighting the main activities carried out, achievements and networking challenges of Eastern and Southern Africa. The meeting adopted the report and the chairperson concluded by thanking all donors, NGOs and governments for their continued assistance to ATNESA over the years.

The Chairman's report of activities is provided as Annex 3

Treasurer's report

The financial report was presented by the ATNESA treasurer Dr. P Kaumbutho. He emphasized that all ATNESA funds are solicited from donors for specific activities. Details on how funds are spent are submitted to donors at the end of each activity. Various donors can therefore be seen as the ATNESA accountants and auditors. These reports are available to members on request.

Dr. Kaumbutho explained that the main source of revenue for ATNESA has been workshop registration fees and recently, through the sale of T-shirts. The meeting discussed the report and suggested that the steering committee should look into the possibilities of introducing membership fees and soliciting funds for specific projects where small overheads can be charged. The meeting adopted the report, which was well documented. It was announced as available for whoever needed to peruse it.

Amendment of statutes

The Chairperson, on behalf of the Steering Committee proposed to the general assembly the amendment of the Statutes as follows:

Proposal 1: Section 3: Article 5

Current Statement: *"The general assembly of ATNESA will be convened every two years, during a workshop that has been widely publicised....."*

Proposed amendment: "The general assembly of ATNESA will be convened every three years, during a major workshop that has been widely publicised....."

Proposal 2: Section 4: Article 7

Current statement: *"The steering committee will comprise: 6 elected members from Eastern and Southern African countries"*

Proposed amendment: "The steering committee will comprise: Representatives nominated from countries with active national networks and national animal traction programmes". The General assembly will elect one committee member to represent ATNESA countries without a formal national network or programme.

Proposal 3: Section 4: Article 8

Current statement: *"Steering committee members are elected and serve until the*

next general assembly, normally a period of two years.....”

Proposed amendment: “Steering committee members are elected and serve until the next general assembly, normally a minimum period of three years.....”

The meeting adopted the changes and agreed that the amendment in proposal 2 be merged with the current statement and become effective at the next General Assembly.

Elections

Before the election proceedings started, Prof. Simalenga introduced the outgoing steering committee members and thanked them for their efforts and commitment to ATNESA. The old committee had been:

Prof T E Simalenga, South Africa (Chair)
Dr. P Kaumbutho, Kenya (Treasurer)
Ms B Mudamburi, Zimbabwe (Secretariat)
Mr. E Mwenya, Namibia
Mr. N Seobi, South Africa
Dr. A Gebrewold, Ethiopia
Ms L Sylwander, SIDA, Sweden
Mr. G Oodally, FAO, Italy
Prof. P Starkey, UK (Technical adviser)

The relevant sections of the ATNESA statutes relating to elections were read out. These stressed the importance of geographical, disciplinary and gender balance on the steering committee. Dr. Dag Austbo from Norway was appointed as returning officer for the election.

Participants from each country represented selected one candidate for possible election. The elections were conducted by secret

ballot, with each voter entitled to six votes, to select any six candidates.

New steering committee

The following were elected as the new steering committee members:

Dr. Alemu Gebre Wold, Ethiopia
Dr. Pascal Kaumbutho, Kenya
Dr. Edward Nengomasha, Zimbabwe
Ms Enny Namalambo, Namibia
Mr. Wells Kumwenda, Malawi
Mr. Bruce Joubert, South Africa.

The new Steering Committee appointed Dr. P Kaumbutho as Chairperson, Dr E Nengomasha as Treasurer, Mr. B Joubert as Secretary and Ms E. Namalambo and Mr. W Kumwenda as Publicity Secretaries.

In his acceptance speech, the new Chairman set some priorities which included:

- Sensitization and publicity for animal traction development in the region.
- Project proposal development for user-level, inter-country, animal traction activities.

He thanked all that had helped build ATNESA and requested all members to cooperate with the new Steering Committee in order to accomplish the tasks which lie ahead of ATNESA as it enters the new millenium.

The meeting was closed at 19:30 hrs.

10. Workshop evaluation

The workshop evaluation was done through a questionnaire which was given to participants. A total of 71 questionnaires were filled in and submitted. Generally, the workshop received ratings between good and very good in various aspects as demonstrated in the bar chart below. The low rating of field demonstrations was attributed to the unexpected turn up of the large number of village level observers. The community which attended the function like there was a shortage of such happenings were all over the place and this made it almost impossible to carry out an effective demonstration of the various technologies.

The bar chart shows the scores made by each aspect of the questionnaire. The questionnaire was designed with a designated scoring structure, which helped analyze the responses in a rating format. Additionally there were open-ended questions which are discussed below.

Open ended questions

The open-ended questions helped participants express their own views on what could have been the best and most useful aspects of the workshop as well as what could have been improved. Generally, there was a number of common views on various issues which made it easy to make 'clusters' of responses. It was also felt necessary to bring out what could have been 'individual views' on very important issues. All these are discussed with the number of respondents shown in brackets.

Best and most useful aspect of the workshop?

The majority of the participants indicated networking- collaboration and sharing ideas with people from various countries and making new contacts as most useful aspects of the workshop (35). Some participants were happy with the various papers presented and variety of topics covered. Others found group discussions most useful (5) while some indicated their useful aspects being farm visits (5). There were also individual views indicating poster display, country presentations, the theme, entire workshop organization and display of implements during field demonstration being the most useful aspects of the workshop.

What could have been improved?

There were a lot different responses on what participants felt should have improved. There was a general feeling that plenary sessions were too long and instead there should have been more time for group discussions, allowing in-depth discussions and for formal poster presentations (21). Suggestions included limiting paper presentations to one and half days and leave the rest of the time to do group work. Evening sessions to be used for group discussions on specific topics (7).

Many participants indicated the need to improve on the organization of the field day and demonstrations (13). Regarding allocation of tasks for action planning, it was felt that a sense of insecurity was instilled in many participants who were not sure of how to carry out such tasks especially those that demand external funding. One participant

suggested that ATNESA should help source funding for such activities.

Other improvements could have been allowing farmers to present their farming status and including farmers from other countries (1). Others included in-country co-ordination among interest groups (1) and presentation of a summary of day's activities by rapporteurs at the end of each day

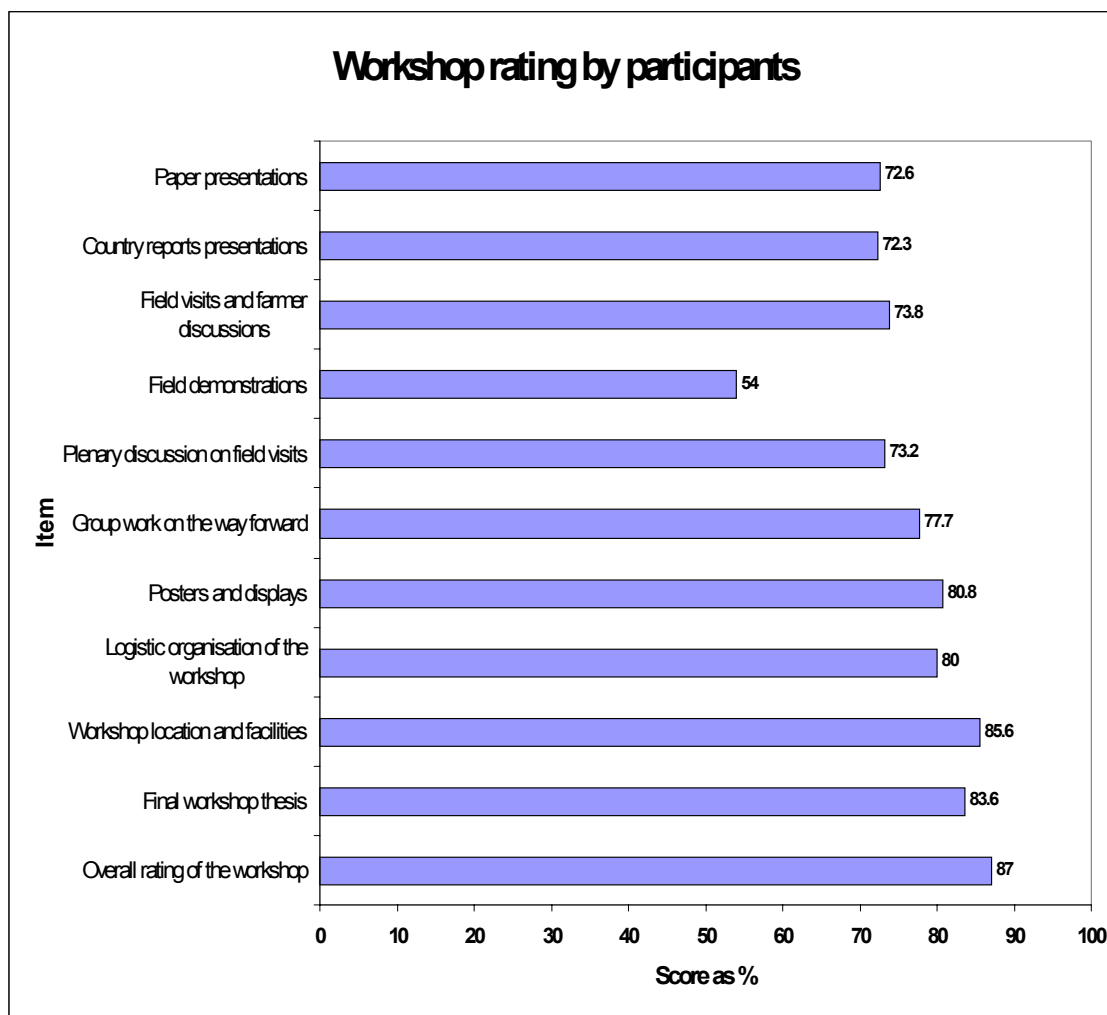
Any other comments?

Participants expressed their gratitude to ATNESA and encouraged the organization to keep up the good spirit in development and promotion of draft animal power in the developing countries (13).

The new Steering Committee was urged to collaborate with the out-going members and all ATNESA members to give support to the new committee for effective and efficient performance (1).

A question was raised as to how much is being done on the ground regarding animal traction. There was a call for researchers, extensionists and trainers to be more practical and focussed and to find ways in which farmers can gain access to the technology (1).

Workshop evaluation chart:



Annex 1:

Workshop programme

Saturday, 18th September: Arrival of participants in South Africa (Overnight in Johannesburg)
Sunday, 19th September: **Arrival of participants at Loskop Dam**

14h00	Registration
16h00	Setting up posters and exhibits
18h00	Workshop opening and Dinner

Monday, 20th September

Session 1: General review papers: issues and challenges

Chairperson: Mr Emanuel Mwenya

08h00	Introductory remarks [ATNESA and SANAT Chairpersons]
08h30	South Africa paper: Country synthesis presentation [B Joubert]
09h15	Empowering farmers with Animal traction: worldwide trend, issues and challenges [P Starkey]
10h00	Tea/Coffee
10h30	Conservation tillage systems and environmental issues. [P Kaumbutho and E Mwenya]
11h15	Empowering people through donkey power. [E Nengomasha, A Gebrewold and A Pearson]
12h00	General discussions
12h30	Lunch

Session 2: Participatory R & D and Technology Transfer

Chairperson: Mr Richard Fowler

14h00	Technology transfer and on-farm evaluation of animal powered equipment: Experiences of IMAG-DLO/SAMeP [A Wanders]
14h45	Conservation tillage and integrated watershed management: Field experiences on extension approaches [J Rockstrom]
15h30	Farmer participatory development and testing of implement and harnesses for animal traction in Ethiopia [M Temesgen]
16h00	Networking announcements and country reports
18h30	Evening meal and optional programmes

Tuesday, 21st September

Session 3: Entrepreneurship, Gender and Rural Transport

Chairperson: Ms Enny Namalambo

08h00	Entrepreneurship in animal traction: Empowering local initiatives [T Simalenga, R Shetto and S Mkomwa]
08h30	Empowering through animal based rural transport: Issues and challenges for farmers and pastoralists [C Oram and P Kaumbutho]
09h00	Gender issues in Animal Traction and Rural transport [S Musa, E Waithanji and F Lubwama]
09h30	Supply and distribution of implements and spares [T Lorenzo and C Hawksley]
10h00	General discussions

10h30	Tea/Coffee Session 4: Animal Welfare, Nutrition and Management Chairperson: Prof. L. Ndlovu
11h00	Multipurpose use of work animals in smallholder farming systems [A Gebrewold, J Dijkman and A Pearson]
11h30	Strategies for improving the effectiveness of crop residues as supplementary feeds for working cattle in semi-arid regions [S Israel and A Pearson]
12h00	Management of draught animals: A welfare and health perspective [M James and T Krecek]
12h30	Lunch
	Session 5: Case Studies and Poster Presentations Chairperson: Dr Edward Nengomasha
14h00	Role of information technology in dissemination of DAP technologies [J Swiegers]
14h30	Working Nd'ama in Gambia. [Y Akinbamijo]
15h00	Challenges of Animal Traction in the 21 st Century: Experiences of various projects in Namibia. [P Talavera]
15h30	Outline of field visits/demonstrations
16h00	Tea/coffee
16h30	Poster viewing and exhibits presentation
18h30	Braai followed by optional programmes

Wednesday, 22nd September

06h00	Field visits
10h30	On-farm demonstrations
14h00	Small group discussions related to field visits and demonstrations
16h00	Informal networking and free afternoon SANAT AGM

Thursday, 23rd September

08h00	Plenary session, issues and formation of working groups
09h00	Group discussions: Strategies for regional and national level activities
10h30	Tea/Coffee
11h00	Group discussions continue
12h30	Lunch
14h00	Plenary session: Presentation of group discussions
16h00	ATNESA AGM
19h00	Workshop dinner

Friday, 24th September

08h30	Plenary session and workshop synthesis
10h00	Recommendations and follow-up actions
12h00	Workshop evaluation and closing
12h30	Lunch
13h30	Departure for Johannesburg for Saturday, 25th September flights home

Annex 2:

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Annex 3

Report of ATNESA activities and networking challenges in East and Southern Africa.

Prepared by T E Simalenga

ATNESA Chairman (1995 - 1999)

1. Introduction

The report gives a brief historical background on the development and status of ATNESA (Animal Traction Network for Eastern and Southern Africa). The report also highlights ATNESA activities, networking challenges and lessons learnt about animal traction development and its promotion in the region. The future role of ATNESA, networking activities and approaches to meet the needs of farmers in the region are proposed.

1.1 The launch of ATNESA

In 1987, the Southern African Centre for co-operation in Agricultural Research (SACCAR) organised a regional animal traction workshop in Maputo, Mozambique. The workshop resolved that a regional information-sharing network should be established under the auspices of SACCAR. However, due to institutional and organizational reasons, there was no immediate follow-up to the idea.

In November 1990, the then AGROTEC, (programme on Agricultural Operations Technology for Smallholders in East and Southern Africa) organized a course on planning integrated animal draft programmes in Harare, Zimbabwe. During the course, the decision to launch the regional network was reached and a provisional steering committee of six people from different countries was selected to discuss organization details and prepare an action plan for the network. At this meeting, it was also resolved that a major workshop be held in two years time where the network statutes would be presented and approved by the General Assembly.

The first ATNESA General Assembly was held in January 1992, during a major workshop held in Lusaka Zambia. A total of 107 people from 17 countries participated. At the meeting, the statutes were formally adopted and a new steering committee was elected. The steering committee was given mandate to arrange a programme of activities based on the workshop recommendations.

1.2 Objectives and ATNESA activities

ATNESA was launched with the main aim of improving information exchange and regional cooperation relating to animal draft power. The network aims to unite researchers, trainers, manufacturers, development workers, institutions and the users of animal traction in the region. Membership of the network is open to all individuals and organizations interested in the objectives of ATNESA. These may include: research institutions, development projects, NGO's, farmers associations and manufacturers. Organizations and individuals from outside the region are welcome as associate members. Currently 15 countries of East and Southern Africa i.e. Eritrea, Ethiopia, Sudan, Kenya, Uganda, Tanzania, Zambia, Malawi, Mozambique, Zimbabwe, Botswana, Namibia, Swaziland, Lesotho and South Africa are country members of ATNESA.

Below are the major aims and objectives of ATNESA which set the direction and guide on the core activities of the network:

ATNESA AIMS and OBJECTIVES

- To promote environmentally sound and sustainable DAP technologies and systems through user-based participatory approaches.
- To strengthen, co-ordinate and provide a base for joint planning and co-operation between individuals and organizations engaged in using draft animals and those carrying out research, extension, training, manufacture and other related activities.
- To stimulate and promote the dissemination and exchange of information, research findings and experiences in animal traction.
- To encourage and stimulate the formation of national animal traction networks.
- To facilitate assistance to Network members on technical and organizational matters relating to the planning, preparation, funding, implementation and evaluation of their animal traction programmes.
- To organize regional activities including biennial workshops, seminars, study tours and professional visits.

2. Progress and achievements

Over the years, ATNESA has been able to organize for: seminars and workshops, surveys and joint research; publications, user, researcher and other networking with various international organizations working in rural development and particularly smallholder agriculture. The following are specifics about the achievements:

2.1 Workshops:

ATNESA recognized that large, wide-ranging workshops were important for encouraging general information exchange and the cross-fertilization of ideas. However, smaller workshops focusing on specific theme were also needed to allow specialists to concentrate on particular issues. Over the years, ATNESA has been able to arrange several important workshop on:

- Improving animal traction technology (January 1992, Lusaka, Zambia)
- Gender issues in animal traction (May 1992, Mbeya, Tanzania)
- Animal drawn carts (January 1993, Harare, Zimbabwe)
- Weeding using animal power (November 1993, Tanga, Tanzania)
- Meeting the challenges of animal traction (December 1995, Nairobi, Kenya)
- Donkey utilization and management (May 1997, Addis Ababa, Ethiopia)
- Conservation tillage with animal traction for soil-water management and environmental sustainability (October 1998, Rundu, Namibia)

Through these workshop, more than 400 people from 40 different countries worldwide have been able to meet and exchange ideas and initiate collaboration research and extension programmes.

2.2 Formation of National networks:

ATNESA have endeavoured to stimulate the organization of informal or formal national animal traction networks in as many countries in the region as possible. The national networks have goals comparable to those of ATNESA but they operate at national level. They generally aim to influence national policy in favour of animal traction.

National networks have already been formalized in Kenya (KENDAT), Tanzania (TADAP), Ethiopia (ENAT), South Africa (SANAT) and Zimbabwe (APNEZ). Networking in Zambia and Namibia is assisted by National Animal Traction Programmes. Currently discussions to start national networks are taking place in Uganda, Malawi and Mozambique.

2.3 Directories and databases:

ATNESA members and national networks are compiling information on organizations and individuals involved in animal traction. In some countries (e.g. Tanzania and Zimbabwe), annotated directories of animal traction organizations and specialists have already been circulated. A preliminary ATNESA directory of institutions and organizations involved in animal traction and a regional mailing list have been compiled and are available from the ATNESA Secretariat.

Discussions to establish a regional database on Animal Draft Power are going on and a working group has been formed to look at the matter and suggest its operationalization.

2.4 Publications:

ATNESA, in collaboration with other organizations, is publishing a series of workshop proceedings and resource books or discussion papers. These are generally available “free-of-charge” to network members. The following publications are already available:

- Improving animal traction technology (Proceedings of 1992 ATNESA workshop).
- Gender issues in animal traction: a handbook (Proceedings of Gender workshop).
- Animal drawn carts: Guidelines for design, manufacture and testing animal drawn carts.
- Workshop Report: Meeting the challenges of animal traction.
- Workshop Report: Improving Donkey utilization and management.
- Workshop Report: Opportunities for conservation tillage with animal traction.
- Harnessing donkeys (information leaflet).
- Animal power for weed control (in print).
- Donkeys for rural development (in print).
- Meeting the challenges of animal traction (in print).
- Conservation tillage with animal traction.
- Bibliography on donkey utilization and management

2.5 Collaboration activities

Several ATNESA members have been involved in initiating joint research activities and organizing or preparing national programmes. The following are some of the activities carried out recently:

- With KENDAT and IFRTD/NFG; organized a workshop and initiated an East African project on rural transport
- With UNFA and NARO in Uganda; facilitated a Stakeholders Workshop and participated in a national project write-up on animal traction development.
- With Ministry of Agriculture Water and Rural Development (MAWRD in Namibia; participated in a write up for a national programme in conservation tillage.

2.6 Networking with other organizations

ATNESA encourages linkages with other networks and resource organizations to foster co-operation, and stimulate networking. Some of the organizations which collaborate with ATNESA include:

IFRTD: International Forum for Rural Transport and Development
RTTP : Rural Travel and Transport Programme of World Bank
RELMA: Regional land and Management Unit, SIDA regional programme
SEASAE: Southern and Eastern Africa Society of Agricultural Engineers
RELATA: Latin America Network of Animal traction.

3. Some lessons learnt and future approach

It has been observed that networking can effectively link people who would not otherwise interact. The main benefits which arise from networking, are the exchange of experiences, information and materials and publications and cooperation in development and extension programmes. This leads to elimination of unnecessary duplication of work and effort. Networking can also stimulate and bring together funding and technical cooperation agencies and those in need of resources and support.

Below are some of the main lessons and constraints ATNESA has experienced:

3.1 Network co-ordination:

When ATNESA started, it had adopted an informal networking with most of work delegated to national networks. However, experience has shown that for a network to operate effectively, there is a need to have a small but effective secretariat or a coordinating unit with possibly a Coordinator and Secretary. The major role of the secretariat is not to centralize the activities but facilitate its execution and coordinate day to day activities.

In 1997, the steering committee approved the establishment of a Secretariat Office in Harare. Currently the Secretariat is coordinated by Mr. Mbanje. The secretariat address is: PO Box BW 540, Borrowdale, Harare Zimbabwe. Email: atnesa@iae.icon.co.zw. The challenge at hand is to strengthen the Secretariat.

3.2 Funding:

Networks need both user-support and adequate resources for activities. International networking is not possible without constant flow of funds. ATNESA has survived through funds requested to carryout specific activities. Several institutions, donor agencies and regional projects such as AGROTEC (now FARMESA) have provided in-kind support from time to time. FARMESA have also provided 2 computers, a scanner and some other office equipment.

Other donors who have supported ATNESA over the years include: DFID, CTA, CF, FAO, Zimplot and French mission.

3.3 Communication:

Communication is vital for successful networking. However, most of the countries covered by ATNESA have poor communication systems. This has sometimes frustrated networking efforts. Telephones where available are very expensive, and communication through letters takes up to two weeks to be delivered. The use of information technology especially emails should be strengthened. It is also proposed that in future an ATNESA website be established

3.4 Farmers involvement:

While ATNESA objectives state that the network needs to be user-oriented, members are mainly salaried professionals. Users (especially farmers and rural transporters) in the region have been involved during field visits, carried out during the workshops. While they may be more involved in national level activities, this needs to be changed. Greater user involvement could come from user workshops and technology transfer exchanges. The future challenge of ATNESA is to stimulate the developments of animal traction through participatory, user-oriented programmes.

3.5 National network constraints:

Ideally, the management of national networks should be easier compared to multi-national network ones. However, experience has shown that this is not always true. Lack of initiatives and network volunteers makes the networks perform below expectation. The main object of national network i.e. acting as a lobbying body to policy makers is yet to be realized. Lack of operational funds has made most of the networks to rely on the institutions (where the office bearers are based) to use the workplace resources for the operations of these networks. This can be limiting in scope and in free access by users.

3.6 Voluntary work:

Most of the networking coordination is carried out by volunteers and this requires dedicated people who are motivated and who accept to be rewarded through academic achievement. This is very difficult especially in third world countries where the majority of people are struggling to make ends meet.

4. Conclusions

To increase the awareness of the potential of animal traction in the development of the region, ATNESA have evolved as a powerful, informal regional network that focuses on animal traction issues while generating enormous interest. The network initially concentrated in providing mechanisms for propagation of information and exchange of experiences between members by holding of small regional workshops on different topics. Future activities will need to concentrate in undertaking joint activities on collaborative farmer training, research and development.

While it is intended that the network will ultimately serve and benefit smallholder users, such people have so far been adequately involved in only a few countries. In others, they have been actively involved in the network through farm-based discussion in workshop planning and meetings. Future efforts will be directed for ATNESA members to work very closely with users to discuss the many uses of draft animal power technology. It is also proposed that animal traction workshops, specifically for users be initiated.

In conclusion it is observed that the combination of necessity, enthusiasm, judicious planning and good fortune allowed ATNESA to develop as an effective network with rapid progress. Whatever formal network organizational systems evolve, it is most important that active networking interactions are maintained. The networks can survive on low overheads but do need adequate resources to sponsor regular, sharing opportunities.

Annex 4:

List of papers submitted for the workshop

<i>Name</i>	<i>Country</i>	<i>Paper</i>
C. Patrick, B.V.E. Segwagwe and A.A. Aganga	Botswana	A review of donkey use in Botswana over a ten year period
A. Aganga, C. Patrick and B.V.E. Segwagwe	Botswana	Animal traction technology in Botswana: Potential and constraints
B.V.E. Segwagwe, A.A. Aganga and C. Patrick	Botswana	An investigation into the common diseases of donkeys (<i>Equus asinus</i>) in Botswana
B. Ahmadu, N. Chisenga and P. Chipasha	Zambia	Performance of donkeys as draught animals in Zambia: An overview
Melesse Temesgen	Ethiopia	Animal drawn implements for improved cultivation in Ethiopia
J. Swiegers	South Africa	The role of information technology in agricultural development
P. Jones	South Africa	Hitching is the problem with harnessing donkey
P.Jones	South Africa	Calculating true costs of donkey ownership
A.D.C. Chillimba	Malawi	Conservation tillage in cotton and maize fields in Malawi
A. M. Dlamini	Swaziland	Welfare and utilization of livestock for draught in Swaziland
G. Oodally, C. Jenane and H. Belemilih	Morocco	Present and future prospects of animal traction in Morocco
T.W. Scheidtweiler	Germany	Animal drawn punch planters: A key technology for smallholder agricultural development in the 21 st century
S. Israel, and R.A. Pearson	UK/Tanzania	Strategies to improve the effectiveness of supplementary feeding for working cattle in semi-arid crop/livestock systems

J. Rockstrom, A. Kitalyi and P. Mwalley	Kenya	Conservation tillage and integrated watershed management: Field experiences and extension approaches
G. Singh	India	Empowering farmers through animal traction in India
G. Singh	India	Draught animal energy research in India
J. Mulanda, E. Mwenya and E. Namalambo	Namibia	Animal traction in Namibia: a challenge for Namibia agricultural colleges
O.O. Akinbamijo, R.A. Pearson and T.W. Jones	Gambia	Work stress innate resistance of working bulls on two planes of nutrition: Lessons from the N'dama cattle of West Africa
P. Talavera	Namibia	Challenges of Animal traction in the 21 st century. The experiences of various projects in the North Central Division of Namibia
W. F. Kumwenda	Malawi	Animal drawn agricultural machinery supply, distribution and services in Malawi
E. Mbanje and B. Mudamburi	Zimbabwe	Collaborative efforts in the development of animal powered tillage implements in Zimbabwe
M.S. L. Kumwenda	Malawi	Strategic dry season supplementation of traditionally managed draught animals in Northern Malawi: Current practices and proposed strategies for the future
A. Lewa, T.A. Ngatia, W.K. Munyua and N.E. Maingi	Kenya	Pathological lesions associated with internal parasitosis in donkeys in Kiambu district, Kenya
A. Lewa, T.A. Ngatia, W.K. Munyua and N.E. Maingi	Kenya	Comparison of haematological changes and strongyle faecal egg counts in donkeys in Kiambu district, Kenya
M. James and R.C. Krecek	South Africa	Management of draught animals. A welfare and health perspective
J. Ayo- Odongo, C. Mutyaba and P. Kalunda	Uganda	Improving on-farm transport using animal draught power in two hilly mountainous districts of Western Uganda
F. Ali-Nejadfard	Zimbabwe	Rural travel and transport and economic development - Problems and prospects in rural Africa - Examples of Malawi and Zimbabwe

R.M. Shetto, S. Mkomwa and T.E. Simalenga	Tanzania	Entrepreneurship in animal traction: Empowering rural initiatives
T Lorenc , W Chipera and M McMaster	Zimbabwe	Supply and distribution of animal drawn equipment
J. Mutua and J.N. Mwangi	Kenya	Transport of goods by animal power in a diverse temporal and spatial environment. A case study of Lari, Division, Central Kenya
E. A. Ajav	Nigeria	Animal traction as an alternative source of power for agricultural development in Nigeria
J. Phakati	Zambia	Participatory rural development and technology transfer empowering small scale farmers with appropriate technology skills
T.E. Simalenga, A. Belete, N.A. Mseleni and L.L. Jongisa	South Africa	Profitability of animal traction under smallholder farming conditions in Ciskei region, South Africa
J. Turton	South Africa	Assisting smallscale farmers to produce healthy animals
F. B. Lubwama	Uganda	Gender issues in animal traction and rural transport in Uganda
R. Mofya and N. Chisenga	Zambia	Gender and animal draught power: Experiences of Palabana with smallscale farmers in Zambia
S. Musa	Sudan	Gender issues in animal traction and rural transport
E.M. Waithanji	South Sudan	Gender issues of animal traction in South Sudan
B Joubert and T.E. Simalenga	South Africa	Mechanizing agriculture using animal traction and small scale irrigation
D. Hanekom	South Africa	The adaptation of a ripper-planter unit for local conditions
B. Joubert	South Africa	The horse drawn hitch cart
P. H. Starkey	UK	Rapid appraisal methodologies for animal traction
R.M. Mwanza	Kenya	Possible use of wild animals in provision of DAP in the 21 st Century

B. Joubert and J. Kotsokoane	South Africa	Animal traction in South Africa into the 21st Century
P.G. Kaumbutho E. Mwenya	Kenya/Namibia	Preserving the environment through conservation tillage with animal traction
P. H. Starkey	UK	Empowering farmers with animal traction: worldwide trends, issues and challenges
E.M. Nengomasha, R.A. Pearson and Alemu Gebre Wold	Zimbabwe/UK/Ethiopia	Empowering people through donkey power into the next millenium
A. A. Wanders and P. Stevens	Netherlands	Technology transfer and on-farm evaluation of animal powered equipment: approach and experience of IMAG-DLO
M. Havard, A. Njoya, R. Pirot, E. Vall and B. Wampfler	France & Cameroon	Challenges of animal traction research and development in West and central Africa at the eve of the 21 st Century
C. Kaoma- Sprenkels and N. Mwenda	Zambia	Community based cattle projects in Zambia: A new approach to oxenization
J.T. Dijkman, Alemu Gebre Wold and R.A. Pearson	Ethiopia/UK	Multipurpose use of work animals in smallholder farming systems
M. L. Makaota	South Africa	The role of animal traction in the Molpo district of North-West Province
C. Oram	UK	Issues and challenges into the 21st Century in animal-drawn transport
E.Z. Mushi, M.G. Binta and R.T. Ndebele	Botswana	Haematological studies on apparently healthy donkeys in Oodi, Kgatleng district, Botswana

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Formal National Networks*

*There are several countries with extensive animal traction activities but without formal networks. These are such as Zambia, Namibia, Uganda, Malawi, Mozambique, Lesotho, Swaziland and Botswana. In some of these countries plans are underway towards formalized networks).



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