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**Networking for Sustainable
Agriculture:
Lessons from Animal Traction
Development**

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This Gatekeeper Series is produced by the International Institute for Environment and Development to highlight key topics in the field of sustainable agriculture. Each paper reviews a selected issue of contemporary importance and draws preliminary conclusions of relevance to development activities. References are provided to important sources and background material.

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EXECUTIVE SUMMARY

Many of those involved in agricultural development are isolated from the wider experiences of others. This is so whether they are on a farm, or in an NGO office, international research centre, government ministry or aid agency headquarters. Information flows tend to be top-down and narrow, and restricted to single disciplines, limited geographical areas and the prevailing organisational persuasion. When an agricultural development initiative is required, individuals or organisations use whatever is immediately at hand or design something new. They rarely have the time, vision, experience or facilities to compare their needs with the options available worldwide, and to consider how these could be obtained locally in the available time.

Networks can help overcome such problems by allowing people and organisations to exchange information and experiences and to cooperate with those outside their immediate working environment. A network is any group of individuals or organisations which, on a voluntary basis, exchanges information or undertakes joint activities in such a way that the individual autonomy of its members is strengthened by the interactive process of networking.

This paper explores the value of networking by assessing the experiences of animal traction networks in Sub-Saharan Africa. With the inflow of donor funds that followed the well-publicised Sahelian droughts, many donor-assisted projects were established in Africa to introduce (or re-introduce) and/or research animal traction technologies. These projects tended to work in isolation. Several experienced serious problems, often through insufficient understanding of the technical, social and economic implications of using animal traction technology in a particular farming system. Networks seemed not only extremely desirable but also feasible. The two international networks which evolved, one for East and the other for West Africa, brought many benefits to their members: improved information exchange; reduced duplication of effort; awareness of other's concerns and activities; critical mass for policy change; improved ability to address complex problems; cooperation between diverse groups; and peer support.

Be they formal or informal, national or international, networks can be extremely valuable and cost-effective mechanisms for enhancing agricultural development. Much has been learnt from the experiences of these networks about how they can be supported and strengthened.

- They should have clear objectives.
- Their success depends upon a committed core group of individuals or organisations.
- Complementary networks linked both horizontally and vertically can enhance information exchange, encourage collaboration and improve targeting.
- Farmer participation in networking processes needs to be encouraged.
- Although networks need resources to be effective, funding is not everything. The combination of member enthusiasm, involvement and adequate funding seems ideal.
- Social and political legitimacy attracts participation and facilitates funding.
- Networks require regular monitoring and evaluation.

The provision of strategic support to networks should be seen as an investment for meeting development objectives efficiently. Good networks have been shown to have very persistent and wide-ranging benefits resulting in reduced programme wastage, cost-savings and higher returns to human efforts.

NETWORKING FOR SUSTAINABLE AGRICULTURE: LESSONS FROM ANIMAL TRACTION DEVELOPMENT

Paul Starkey

Introduction

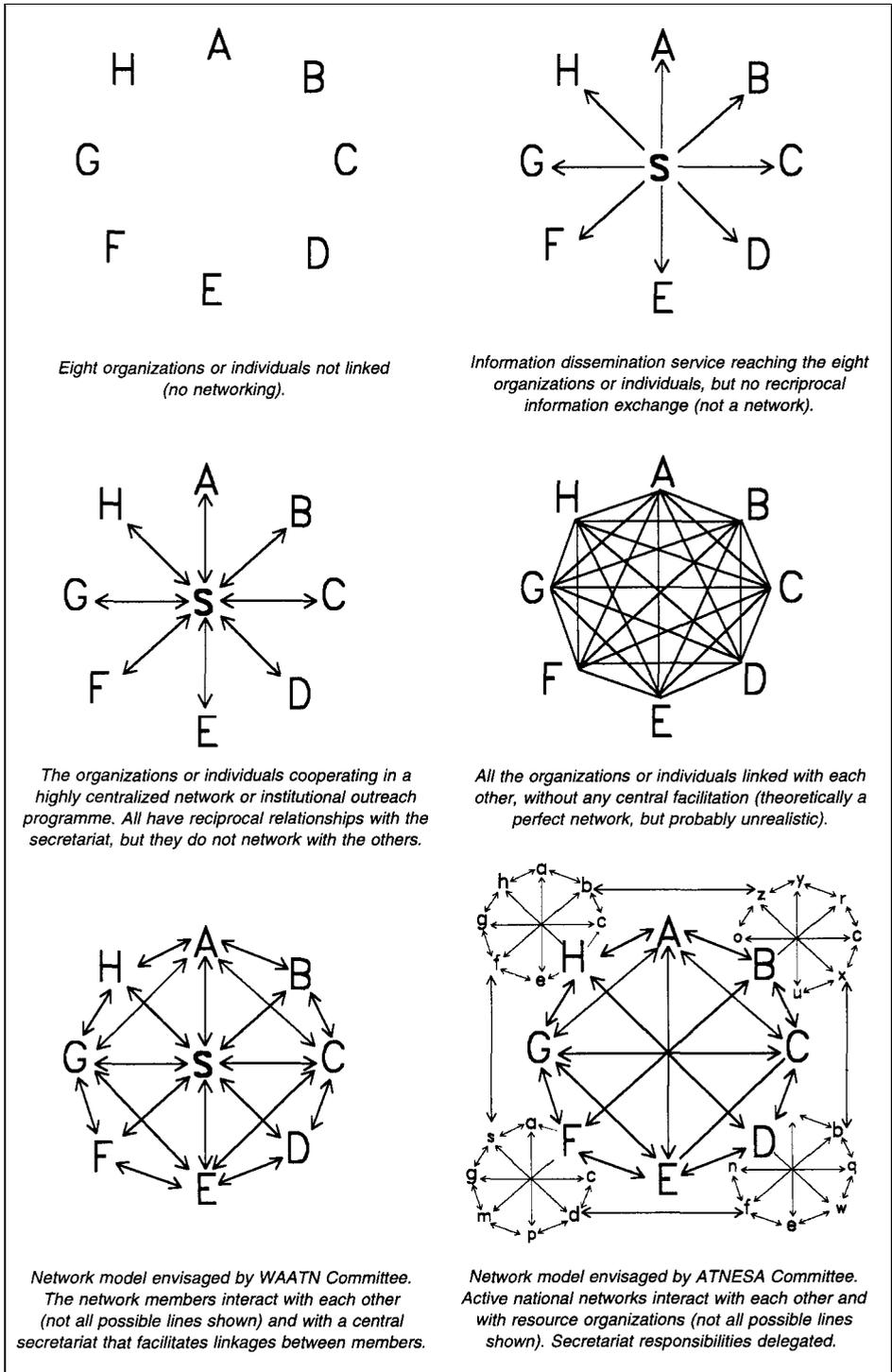
In an ideal world, agricultural development networks would not be necessary. Individuals and organisations involved in similar areas of farming, research, development, training, extension and infrastructural support would be well linked. They would be in touch with farmer realities, policy implications, new research initiatives, and experiences in other places. They would be aware of the advantages and disadvantages of the technological, biological, socioeconomic and administrative options available for agricultural development. They would have the resources to undertake their work. They would collaborate with colleagues whenever this would be beneficial. Government, organisations and farmers would listen to them when they had some valuable recommendations to make.

In the real world, those involved in agricultural development experience very separate realities, and tend to work in isolation from the wider experiences of others. This is so whether they are on a farm, or in an NGO office, international research centre, government ministry or aid agency headquarters. Any information flows tend to be top-down and narrow, restricted to single disciplines, limited geographical areas and the prevailing organisational persuasion. When an agricultural development initiative (plant, animal, farm input, technology, training scheme, research idea etc.) is required, individuals or organisations use whatever is immediately at hand or design something new. They rarely have the time, vision, experience or facilities to compare their needs with the options available worldwide, and to consider how these could be obtained locally in the available time.

Networks can help overcome such problems by allowing people and organisations to exchange information and experiences and to cooperate with those outside their immediate working environment. A network is any group of individuals or organisations which, on a voluntary basis, exchanges information or undertakes joint activities in such a way that the individual autonomy of its members is strengthened by the interactive process of networking. Networks have been classified in many ways: by their membership, their geographical scope, their main activities, their objectives and their organisational structure (Figure 1). But it is the multidirectional *process* of networking that is vital, and more crucial than the network structure itself.

This paper explores the value of networking by describing and assessing the experiences of animal traction networks in Sub-Saharan Africa. By discussing the problems and benefits associated with the networks, the paper seeks to direct those involved in the formation of networks, or the strengthening of the networking process, towards an approach which will

Figure 1. Some network models



maximise the role of networking in promoting efficient, effective and sustainable agricultural development.

Background: Animal Traction in Africa

In many parts of the world, animal traction is seen by farmers and policymakers as an appropriate, affordable and sustainable technology, requiring few external inputs. Work animals can be used to reduce drudgery and intensify agricultural production, so raising living standards throughout rural communities. Cattle, buffaloes, donkeys, mules, horses, camels and other work animals can provide smallholder farmers with vital power for crop cultivation, transport and mobility. Draft animals can also be used for water raising, milling, logging, land levelling, road construction and local marketing.

Animal traction is an environmentally friendly technology that is based on renewable energy and that assists the ecologically efficient integration of livestock and crop production. Draft animals not only produce manure, but also transport composts to the field. The energy source (mainly pasture and crop residues) is ecologically renewable and neither depletes fossil reserves nor requires foreign exchange. The technology is sustainable within rural areas without the need to transfer wealth to industrialised regions. Individual families, rural economies and marketing systems benefit considerably from the economic stimulus provided by animal-powered transport.

Animal traction has been widely used in North Africa and Ethiopia for thousands of years, and in several parts of Africa there has been a long history of using animals for riding and pack transport. However, in much of sub-Saharan Africa the introduction of animal power for tillage and wheeled transport is relatively recent. In most countries the technology spread slowly during the first half of this century. Fastest adoption rates were experienced in areas with relatively developed crop marketing systems, particularly for cotton and groundnuts.

During the 1960s and early 1970s, animal traction received relatively little attention from newly independent governments. This was a period when people thought that the rapid tractorisation seen in Europe and North America would also take place in African countries. Animal traction was dropped from the curriculum of agricultural colleges in Europe and was also often omitted in Africa. A generation of agricultural students graduated with little formal training relating to animal traction. These agriculturalists were often rapidly promoted within ministries and research organisations and became responsible for planning and implementing agricultural projects and programmes.

By the late seventies, higher oil prices, foreign exchange shortages and numerous failed tractor schemes suggested that rapid motorisation was not after all economically viable or practicable in the majority of African smallholder farming systems. Donors and governments (even in oil-rich countries like Nigeria and Cameroon) now began to see animal traction as offering considerable economic, environmental and social benefits and therefore as a serious but neglected development option. The available technology,

however, had not changed for more than a generation. There was need for relevant research, development and extension.

With the inflow of donor funds that followed the well-publicised Sahelian droughts, many donor-assisted projects were established in Africa to introduce (or re-introduce) and/or research animal traction technologies. These projects tended to work in isolation. Several experienced serious problems, often through insufficient understanding of all the technical, social and economic implications of using animal traction technology in a particular farming system (Sargent et al, 1981; Munzinger, 1982; Starkey, 1986).

Early Days for the Animal Traction Networks in Africa

In 1982, the Food and Agricultural Organisation of the United Nations (FAO) convened an expert consultation on animal traction. This concluded that improved information exchange was extremely important (FAO, 1982, 1984). As a follow-up, FAO, in conjunction with the International Livestock Centre for Africa (ILCA), organised a series of missions to 12 African countries between 1983 and 1985 to investigate the possibilities of establishing an animal traction network in Africa (Imboden, et al, 1983; Starkey and Goe, 1985). These missions found that there was very little information exchange between countries or even between programmes within countries, with neighbouring projects often 're-inventing the wheel' in almost total isolation. A network seemed not only extremely desirable but also feasible, and the idea received strong support from projects and national ministries. The missions suggested launching a network, first in West Africa (Box 1), to be followed quickly by complementary initiatives in Southern and Eastern Africa (Box 2).

Lessons from the African Networks

Network Typology and Membership

Both WAATN and ATNESA have evolved as semi-formal, regional networks. The networks are open, accepting members from a wide range of backgrounds and disciplines. Both networks have concentrated on information exchange between members as the best means of achieving their objectives. This has led to collaborative activities in training, research and development. While the ultimate aim has been to benefit the end-users of animal power (the smallholder farmers and transporters), network activities have been designed to directly benefit the work of network members. The networks have some external orientation since they also aim to influence non-members (the public, governments, aid agencies) to view animal traction sympathetically and allow policies favourable to animal power users.

In the international workshops smallholder farmers have only been involved actively through farm-based discussions. In practice farmers' interests to date have tended to be represented by individuals and organisations working with farmers (directly or indirectly;

Box 1. The West Africa Animal Traction Network (WAATN)

WAATN was launched at a small workshop in 1985 organised by the Farming System Support Project of the University of Florida and hosted by a USAID-funded animal traction project in Togo. The participants discussed technical, economic and infrastructural constraints and preconditions for the successful development of animal traction.

Since then, WAATN network workshops have been attended by over 200 people and every West African country has been involved. The workshops have stimulated the publication of about 150 papers covering a wide variety of issues and experiences concerning animal traction in different farming systems and related research, development, extension, training, implement production and policy implications. Network publications (in English and in French) have been made available free of charge to organisations working in the region (Poats et al, 1986; Starkey and Ndiame, 1988; Starkey and Faye, 1990; Lawrence et al, 1993).

Other activities include:

- Regional exchange visits between various West African countries focusing on animals, training or equipment.
- Collaborative activities between research and development organisations in Europe and programmes in West Africa. Examples include the Centre de coopération Internationale en recherche agronomique pour le développement, France (CIRAD), GTZ and the University of Warwick. Research has also been arranged in collaboration with regional programmes such as the FAO Trypanotolerant Livestock Programme, based in The Gambia.
- Information diffused through workshops or informally through other network contacts. For example, documents produced in Mali, Sierra Leone, Togo and Senegal are now quite commonly found in other countries in the region. This was not the case when the network was launched.
- Networking within several countries in West Africa. In some countries this was achieved through projects or programmes operating at a national level. For example, the Sierra Leone Work Oxen Programme helped to coordinate animal traction research and extension through a national animal traction committee, national workshops and national and provincial ploughing competitions.

Box 2. Eastern and Southern Africa Network (ATNESA)

The Animal Traction Network for Eastern and Southern Africa was launched in 1990 during a regional course on planning integrated animal draft programmes. WAATN served as an example, and the course participants selected six people from different countries to form an organising committee. The first ATNESA workshop was held in January 1992 in Lusaka, Zambia, to focus on improving animal traction technology.

The ATNESA committee resolved that the network would function largely through the interaction of autonomous national animal traction networks and direct contacts between the different programmes in the region. ATNESA members and the steering committee have therefore tried to stimulate the organisation of informal or formal national animal traction networks in as many countries as possible.

The national networks have similar goals to the international networks. They seek to improve information exchange and collaboration through meetings, workshops, proceedings and publicity materials. They generally aim to influence national policy in favour of animal traction, and are in better positions to 'lobby' than the international networks. Formal national networks have been formed in Tanzania, Kenya, South Africa, Ethiopia and Zimbabwe and less formal national networking initiatives have been undertaken in Botswana, Malawi, Mozambique, Namibia, Uganda and Zambia.

Activities include a thematic workshop in 1993 on the design, testing and production of animal-drawn carts. The participants reviewed successful and unsuccessful cart designs, and drew up guidelines for large-scale and artisanal manufacturing of carts. Recommendations were made relating to harnessing, standardised cart testing, credit provision and other technical and policy issues, and a resource book of guidelines was published (IT, 1996).

A workshop on weed control using animal power was hosted in 1993 by Animal Traction Network, Tanzania (ATNET). Project experiences were reviewed, weeding implements were field-tested and discussions were held with farming families about farm-level constraints. Groups of specialists prepared guidelines for the design, testing, manufacture, distribution and extension of weeding technologies and the proceedings were published by ATNESA (Starkey et al, 1996).

perfectly or imperfectly). In principle, farmers or farmers' groups could be involved more. However, farmers are more directly involved in the activities of national networks.

Perhaps the strongest feature of the two networks is that they are informal African organisations. They did not arise from project documents of donors, nor were they created by any one resource institution. They have grown up from strong member interest and close collaboration with a variety of donor organisations. The networks have received support from several donors and international institutions, but they are not dependent on, or controlled by, any single one of these. Such flexible structures should allow the networks to survive the inevitable changes in the policies and financial support strategies of particular resource organisations. The multi-donor support also reduces the genuine risk of any one

funding agency using its financial muscle to impose its particular policies and priorities on the network.

Network Benefits

While the network members can identify advantages for individuals and programmes of improved knowledge and understanding, it is extremely difficult to measure the benefits of networking. However, if one looks back to the years of work 'wasted' in the past on unsuitable technologies in Africa (such as wheeled tool carriers which were 'perfected yet rejected'), one can see the great potential for savings through networking (Starkey, 1988). For example, one project spent about two million dollars attempting to introduce Asian water buffaloes for work in part of the Sahelian zone of West Africa (Starkey, 1990). This animal traction project (planned before the start of the networks) lacked a farming systems orientation. It did not benefit from networking interactions with colleagues familiar with other, failed, attempts to introduce exotic work animals into sub-Saharan Africa. In retrospect, it seems likely that the money allocated to the project could have been much better used had those responsible for planning and implementation been exposed to the experiences and perspectives of network members.

It is impossible to know how many programmes and projects have benefited, but some clear examples of network influence are known (Box 3).

Box 3. Some Benefits of Networking

To illustrate the genuine yet elusive nature of network benefits, one can take the example of an animal traction project in Guinea. This has not yet itself participated in any 'formal' network activity such as an international workshop. Nevertheless, the leaders of this project made use of some of the network publications mentioned here, to learn of, and then to contact colleagues working in Mali, Senegal and Sierra Leone. This led to a training visit in Mali and the testing of Senegalese and Sierra Leonean implements in Guinea. It also resulted in detailed discussions on technical, economic and organisational issues and the obtaining by the project of documents on a wide variety of topics. Moreover, each contact led to others. For example, the people in Mali were able to discuss the experiences of their colleagues in Togo, whom they had met at a workshop. Such information exchange would have been almost impossible a mere five years before, simply because people in one country were almost completely unaware of each others' activities.

As a result of its networking and its dynamism, the project implemented some well-proven animal traction strategies, and so achieved in two years an output that, in more 'normal' circumstances, might well have taken a project three to four years (Starkey, 1991). Significant savings in human time and project costs were achieved in this one project through networking.

From WAATN and ATNESA experiences, it is clear that networks for agricultural development can provide benefits in several interrelated ways. Some immediate and rapid benefits are likely to be reflected in the work of the network members themselves. Longer term benefits become apparent as development and research programmes become more effective, know-how is transferred and farming systems evolve.

- *Information exchange.* Networks facilitate the exchange of information, skills, knowledge, experiences, materials and media, through meetings, workshops, publications and cooperative programmes. This increases the overall competence of individual or organisational members. Networks can effectively link people of different levels, disciplines, organisations and backgrounds who would not otherwise have an opportunity to interact and learn.
- *Less duplication.* Network information exchange and coordination reduces unnecessary duplication of work and effort, thus facilitating faster progress, cost-cutting and a wider overall impact.
- *Awareness.* Networks can create an awareness for members that many other people and organisations have similar concerns and development problems. This encourages new linkages, interaction, cooperation and mutual support.
- *Critical mass.* Networks can provide the critical mass needed for local, national or international advocacy, action and policy change.
- *Complex problems.* Networks can help address complex development problems and issues that seem overwhelming to those working at village level, such as the selection of technological options for field evaluation.
- *Cooperation.* Networks can link funding and technical cooperation agencies with organisations and individuals in need of resources and support.
- *Peer support.* Networks can provide members with a source of encouragement, motivation and professional recognition. This can be particularly important to those outside the normal hierarchies of government, education and international research.

Practical Problems

In setting up the WAATN and ATNESA networks and by comparing these networks with others, it has become clear that networks, despite their potential benefits, can face many organisational problems.

- *Lack of clear objectives.* Without specific objectives, networks find it difficult to develop dynamic, monitorable programmes, with distinct targets that can be met and free of the manipulation of dominant individuals (Moelinono and Fisher, 1992).
- *Domination.* Networks can easily become dominated by particular organisations and interest groups. Large, resource-rich agencies and institutions with well-educated, confident staff may dominate smaller organisations. Members who are closer to farmer reality may be less well heard than international staff.

- *Centralisation.* Centralisation can occur when a network coordinator, secretariat, steering committee or network board starts to control and run the network for its own sake rather than coordinating and facilitating the activities of its members. Some formal, centralised networks have arisen entirely as a result of top-down planning by international research centres, aid agencies or NGOs. These are not true networks based on the active participation and interaction of autonomous members. Many have been no more than dissemination units for information, technology or genetic materials. Some have provided the parent institution with multi-country research or technology evaluation facilities. In these cases, the term network has been used for public relations purposes only.
- *Lack of resources.* Networks often suffer from lack of funds for network activities and coordination. Where networks do have funds, considerable tensions can be generated through the way the funds are administered and dispersed.
- *Misinformation.* While networks can disseminate valuable information, some information being shared may be of dubious reliability. An atmosphere of questioning and self-criticism is required.
- *Competition.* Competition from networks or organisations with overlapping agendas can lead to creative collaboration but also to competition for recognition, limited resources and membership.
- *Donor interference.* Network members tend to be intimidated by donor and resource institution representatives. Network core groups seldom argue with such people, being concerned not only for network funding but also for their own careers and programmes.
- *Monitoring and evaluation.* There seems to be very little experience relating to the monitoring and evaluation of networks. Some centrally established networks have tried to undertake evaluation exercises to define reliable indicators of network success and to quantify the benefits of networking, but with limited success (Nelson and Farrington, 1994; Smutylo and Koala, 1993).
- *Political constraints.* National and international networks have to operate within the political realities of the country or region. In some countries, information exchange and criticism of government policy is unwelcome and all contributions to newsletters, field trips and attendance at workshops requires government clearance.

Although the WAATN and ATNESA have avoided these major problems to a large extent, neither network has been problem free (Box 4).

Box 4. Major Problems Faced by the African Networks

- Postal services and telecommunications between African countries can be very slow,
- difficult and unreliable. Air schedules and connections within Africa are such that committee members or workshop participants seldom arrive and depart on the same day. Communication problems reduce progress rates and can significantly increase costs and work days lost.
- During the enthusiasm of workshops and meetings, participants often take on responsibilities which are difficult to meet when they return to the practicalities of their own demanding jobs. Conflicting work pressures have also made it very difficult to bring together all members of the steering committee at the same time, or even in sufficient numbers to make binding decisions on future work.
- There has been a tendency for network in-breeding. While a constant steering committee can offer continuity and stability, this may also bring with it a lack of vision and new dynamism.
- Some funding organisations have been inconsistent with their support to networks because of changes in institutional policy, diminishing budgets or the changing whims of particular individuals.
- Most major publications have taken about two years to produce. While this problem is not uncommon, rapid publication remains an important objective for the networks.

The problems highlighted above should be seen in perspective, since despite them, the international and national animal traction networks in Africa have achieved a great deal in the past ten years. Future networking initiatives could benefit from the lessons learned, and so detailed analyses of network strengths and weaknesses have been circulated to network members (Starkey, 1992; 1994).

Network Guidelines and Policy Implications

The experiences of these networks highlight general guidelines. While by no means comprehensive, they do address some of the major ways in which networks can be supported and strengthened to contribute to the development of sustainable agriculture.

Objectives

Networks need to establish clear objectives, which will determine their direction, core activities and the types of individuals and organisations likely to be active members. The objectives should be formulated with a wide cross-section of members (to prevent domination) and should be reviewed periodically to assess progress made and their continued relevance. Networks should be prepared to change their objectives as

circumstances change and their initial goals are met. Networks may be temporary arrangements to tackle particular needs. When these are achieved the networks may have to transform themselves radically to tackle new objectives, or even to dissolve themselves.

Structure

The global impact of some social movements (ecology, women's rights, democratisation, etc.) has been largely due to highly effective networking organisations run by small groups of committed volunteers. Since almost all individuals and organisations involved in agricultural development have excessive demands on their time and resources, network business will only receive adequate attention if it is considered a priority. The people (or organisations) volunteering for, or assigned to, a network core group should, ideally, consider the success of the network as an explicit objective of their professional lives and work.

The highly committed core group must be representative of the network members. They must interact regularly with other network members to keep up with their ideas and changing needs. Without such interaction, network core groups tend towards centralisation and isolation. To help networks stay realistic and clearly oriented towards their beneficiaries, creative ways of including farmers, or farmers' representatives, in network management systems should be developed.

Linkages

There is scope for complementary networks. These should be linked both horizontally and vertically to enhance information exchange, encourage collaboration, avoid competition, reduce duplication of services and improve targeting. Linkages let networks benefit from the different comparative advantages of farmers, national networks and international resource organisations.

Participation

Networks thrive on enthusiastic member participation in specific activities that allow interaction and sharing. Sustained willingness to undertake voluntary duties depends on explicit interest in network objectives and/or wide recognition of the network value. Networks for improving sustainable smallholder agriculture need to encourage farmer participation in networking processes. Ways need to be developed of ensuring that farmers' views and experiences are considered or represented in all relevant aspects of networking. National and international networks are likely to gain from close association with area-specific or national farmer-based networks. Farmer-to-farmer exchanges between different parts of a country, and between countries, could be highly beneficial and could be facilitated and then followed-up.

Resources

Although networks need resources to be effective, funding is not everything, as illustrated by the low impact of some resource-rich networks established by international institutions. By contrast, some networks without any central funding have achieved a remarkable impact, due to the willingness of their members to dedicate their time, effort and personal resources to network activities. Nevertheless money is required for international network participation, and the combination of member enthusiasm, involvement and adequate funding seems ideal.

The more a network can be user-supported, the stronger it will be. User-supplied resources do not have to be financial. One research-development network has made it a point that although membership in developing countries is free, all members must regularly contribute 'in kind' through written articles and professional feedback (Farrington, 1992).

Networks can benefit from being associated with a sympathetic local and/or international agency that can provide access to resources, additional contacts and institutional support services. Safeguards may be required to prevent such institutional arrangements leading to centralisation and/or domination. A network that depends on a single institution or funding agency is highly vulnerable to domination, and even to the sudden termination of its resources at the whim of that agency.

Legitimacy

Social and political legitimacy attracts participation and facilitates funding. Legitimacy is assisted by involvement of influential organisations, effective programmes, an easily recognisable name or logo and well-targeted publicity.

Monitoring and Evaluation

Networks, like all organisations, require regular and thorough monitoring and evaluation. Not only should work plans be continually assessed relative to network objectives, but also network progress and achievements should be evaluated periodically. However, the monitoring and evaluation of networks is extremely difficult. Despite, or because of this, the very process of attempting to assess the effectiveness of network activities is likely to be educational to all involved.

In conclusion, networks can be extremely valuable and cost-effective mechanisms for enhancing agricultural development whether they are international or national and whether formal or informal. They are particularly effective for sharing information, stimulating interaction, strengthening professional support and raising awareness. Policymakers and donor agencies should encourage the creation, function and evaluation of participatory networks in the fields in which they operate. The provision of strategic support to networks should be seen as efficient investments for meeting development objectives. Good networks

have been shown to have very persistent and wide-ranging benefits resulting in reduced programme wastage, cost-savings and higher returns to human efforts.

References

- FAO, 1984. Animal energy in agriculture in Africa and Asia. *Animal Production and Health Paper 42*. FAO, Rome, Italy.
- FAO. 1982. *Report of the FAO Expert Consultation on the Appropriate Use of Animal Energy in Agriculture in Africa and Asia*, held in Rome, 5-19 November 1982. FAO, Rome, Italy.
- Farrington, J. 1992. Synergy between research and networking at ODI. In: *Networking for LEISA*. Background reader prepared for workshop held 9-15 March 1992, Silang, Philippines. ILEIA, The Netherlands.
- Imboden R., Starkey, P.H. and Goe, M.R. 1983. *Report of the Preparatory Consultation Mission for the Establishment of a TCDC Network for Research, Training and Development of Draught Animal Power in Africa*. AGA Consultancy Report, Food and Agriculture Organisation (FAO), Rome, Italy.
- IT. 1996. *Guidelines for the Design, Testing and Production of Animal-drawn Carts*. IT Publications Ltd., London.
- Lawrence, P.R., Lawrence, K., Dijkman, J.T. and Starkey, P.H. (eds). 1993. *Research for Development of Animal Traction in West Africa*. Proceedings of the fourth workshop of the West Africa Animal Traction Network held 9-13 July 1990, Kano, Nigeria. ILCA, Addis Ababa, Ethiopia.
- Moelinono, I. and Fisher, L. 1992. Networking for development: some experiences and observations. In: *Networking for LEISA*. Background reader prepared for workshop held 9-15 March 1992, Silang, Philippines. ILEIA, Leusden, The Netherlands.
- Munzinger, P. (ed). 1982. *Animal Traction in Africa*. GTZ, Eschborn, Germany.
- Nelson, J. and Farrington, J. 1994. *Information Exchange Networks for Agricultural Development: A review of concepts and practices*. Technical Centre for Agriculture and Rural Cooperation, Ede-Wageningen, The Netherlands.
- Poats, S.V, Lichte, J., Oxley, J. Russo, S.L. and Starkey, P.H. 1986. Animal traction in a farming systems perspective. Report of networkshop held Kara, Togo, March 3-8 1985. *Network Report 1*. Farming Systems Support Project (FSSP), University of Florida, Gainesville, USA.
- Sargent, M.W, Lichte, J.A., Matlon, P.J. and Bloom, R. 1981. An assessment of animal traction in francophone West Africa. *Working Paper 34*. Department of Agricultural Economics, Michigan State University, East Lansing, Michigan, USA.

Smutylo, T. and Koala, S. 1993. Research networks: evolution and evaluation from a donor's perspective. In: Alders, C., Haverkort, B. and van Veldhuizen, L. (eds). *Linking with Farmers: networking for low-external-input and sustainable agriculture*. Intermediate Technology Publications, London, UK.

Starkey, P. 1994. Animal traction networks in Africa: background, lessons and implications. In: Starkey, P., Mwenya, E. and Stares, J. (eds). *Improving animal traction technology*. Proceedings of Animal Traction Network for Eastern and Southern Africa (ATNESA) workshop held 18-23 January 1992, Lusaka, Zambia. Technical Centre for Agricultural and Rural Cooperation (CTA), Ede-Wageningen, The Netherlands.

Starkey P, 1992. Networking for animal traction. *Network Discussion Paper 1/92*. Animal Traction Network for Eastern and Southern Africa (ATNESA) and West Africa Animal Traction Network (WAATN). GTZ, Eschborn, Germany.

Starkey, P. 1991. *The Revival of Animal Traction in Kindia region of Guinea Conakry*. Report of a project evaluation. Commission of the European Communities, Brussels, Belgium.

Starkey, P. 1990. *Water Buffalo Technology in Northern Senegal*. Report prepared for USAID-Dakar and Projet Buffle, Saint Louis, Senegal. Tropical Research and Development Inc., Gainesville, Florida.

Starkey P, 1988. *Perfected Yet Rejected: Animal-drawn Wheeled Tool-carriers*. Vieweg for German Appropriate Technology Exchange, GTZ, Eschborn, Germany.

Starkey, P. 1986. Draught animal power in Africa: priorities for development, research and liaison. *Networking Paper 14*. Farming Systems Support Project (FSSP), University of Florida, Gainesville, USA.

Starkey, P., Simalenga, T. and Miller, F. 1996. *Animal Power for Weed Control*. Proceedings of workshop held 1-5 November 1993, Tanga, Tanzania. ATNESA and CTA, Wageningen, The Netherlands.

Starkey, P. and Faye, A. (eds). 1990. *Animal Traction for Agricultural Development*. Proceedings of workshop held 7-12 July 1988, Saly, Senegal. CTA, Ede-Wageningen, The Netherlands.

Starkey, P. and Ndiame, F. (eds). 1988. *Animal Power in Farming Systems*. Proceedings of networkshop held 17-26 September 1986 in Freetown, Sierra Leone. Vieweg for German Appropriate Technology Exchange, GTZ, Eschborn, Germany.

Starkey, P. and Goe, M.R. 1985. *Report of the Third Joint FAO/ILCA Mission to Prepare for the Establishment of a TCDC Network for Research, Training and Development of Draught Animal Power in Africa*. AGA Consultancy Report, Food and Agriculture Organisation (FAO), Rome, Italy.