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ASSESSMENT OF THE VALUE OF FORESTRY RESEARCH NETWORKS IN COMPARISON WITH INDIVIDUAL RESEARCH PROJECTS

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EXECUTIVE SUMMARY

As pressure increases on donors to show impact from public investment in development-oriented research so interest grows in identifying the value of different approaches to research. Two contrasting research structures are examined in this study in an attempt to provide donor organisations with more information when making decisions on which research programmes to support and how to develop projects.

Networks and individual projects are generally seen as opposing approaches to carrying out research yet the structure and function underlying each is poorly understood. This study examines the opportunities that each approach offer forestry researchers through a review of relevant literature, a series of key informant interviews, an assessment of set of case studies and a workshop.

Results highlight the lack of in-depth analysis of the manner in which collaborative research is carried out and draws upon business literature to provide an insight into issues related to knowledge management and the developmental stages of networks.

The study reveals that collaborative research initiatives should be judged on the key criteria of:

- Knowledge creation
- Knowledge exchange
- Creating increased cohesiveness amongst partners (often referred to as 'networking')
- Capacity building

While there are many obstacles to collaborative research these are generally a result of a lack of appreciation of the mechanics of collaboration and the potential benefits the networking can provide in term of development of human and social capital.

While no clear guidelines emerge by which to determine precisely when to approach research issues by networks or individual projects the study emphasises the need to consider qualitative criteria for evaluation of success, most notably the effectiveness of knowledge transfer mechanisms.

The report concludes that it is essential to identify and value the key elements of collaborative research and learn how to apply them for maximum effectiveness.

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R7450 Forestry Research Programme

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LIST OF ACRONYMS

ACIAR	
AFORNET	African Forestry Research Network
CGIAR	Consultative Group for International Agricultural Research
DFID	Department for International Development
EUFORGEN	European Forest Genetics Network
FACTNET	Forest, Farm and Community Tree Network
FRP	Forestry Research Programme of DFID
FTPP	Forest, Trees and People Programme
IAEG	Impact Assessment Evaluation Group of the CGIAR
IARC	International Agricultural Research Centre
ICRAF	International Centre for Agroforestry Research
IUFRO	International Union of Forestry Research Organisations
IPGRI	International Plant Genetics Resource Institute
KM	Knowledge Management
NARS	National Agricultural Research Systems
ODA	Overseas Development Administration
ODI	Overseas Development Institute
OFI	Oxford Forestry Institute
RECOFTC	Regional Community Forestry Training Centre for Asia and the Pacific

1. INTRODUCTION

1.1 Purpose of the study

Statement of the problem

Forestry researchers have a long history of collaboration and were amongst the earliest group of scientists to organise themselves into an international institution, with the establishment of IUFRO in 1892. The benefits of establishing networks to facilitate work that could not be accomplished independently, in addition to reducing costs by sharing experiments and data are widely recognised and continue to provide the impetus to establish more collaborative research projects (Burley 1989, FAO 1998).

Collaborative arrangements for undertaking forestry research are now commonplace and the increasing proliferation of networks is often justified in terms of their ability to combine the objectives of cooperation with a large number of partners, involvement over several countries and the combination of a wide range of skills. However, in spite of the popularity of network-based research there is little evidence upon which to assess its effectiveness particularly when compared with support for individual projects. If we scratch below the surface it becomes clear that we have limited knowledge of networks' functioning, dynamics, costs and benefits, and consequently how they should be understood and evaluated. Reviews of research networks generally confine themselves to reporting the results rather than analysing whether the network was the most effective means of supporting the project's target group. We are therefore faced with a paucity of information available to critically analyse the value of networks when compared with the option of investing research funds in other means of impact delivery. Consequently there is a need to provide donors and research managers with a clear indication of the relevance of network-based research.

The Forestry Research Programme (FRP) of the UK Department for International Development (DFID) is in a similar situation to a many other organisations that are attempting to carry out research under the umbrella of multilateral collaboration. It has supported networks on the assumption that collaboration provides a cost-effective means of achieving objectives but not addressed the problem that the absence of a critical assessment of the validity of this assumption has meant that networks have been established and funded on inadequate justification. The implicit premise that networks are good has often been based on qualitative criteria such as promotion of the profile of the organisation overseas that have more value in the political rather than the developmental arena. As Goldsmith (1995) pointed out, it can be true that collaboration and a broader scope can bring about much greater impacts, but it can also become a convenient excuse for establishing networks without considering the alternatives. It is possible that smaller, more focussed or localised projects can also have important effects when compared with networks that attempt to address all problems at once. After due consideration, the networks alternative might still emerge as the right way to proceed, but there must be a consideration that it is not the only way to proceed.

FRP has funded forestry research networks, mainly in the area of genetic resource evaluation, for over 30 years and during the last 10 years the Programme Managers have become increasingly interested in highlighting their achievements. In this respect FRP is reflecting international interest in the same issue voiced both informally and through more formal channels (e.g. Nair and Dykstra 1998). However, the effectiveness of FRP-funded research networks in terms of their ability to provide meaningful impact has recently been called into question (Henderson 1999).

R7450 was commissioned in response to a perceived need to provide clearer indications of the effectiveness of different organisational approaches to carrying out forestry research.

Objectives of the study

The purpose of the project was to provide guidance to donors and researchers regarding the effectiveness of investing funds in forestry research networks compared with individual research projects. This report investigates and characterises different types of research and dissemination network that are, and have recently been, in operation in the field of natural resources research and identifies both the rationale behind their establishment and their effectiveness at meeting their objectives. In addition, the study aims to highlight how donors can best manage networks sustainably, particularly under changing circumstances, to provide the products and resources of most value to the end users.

Although different types of research network rely on different strategies, it is unlikely that all strategies are equally effective. This report is intended to provide an objective assessment of some to the organisational options available to donors in terms of research management. Through studying the adoption process the report attempts to identify what types of research structure (e.g. regional research network, local network, and individual research project) are most effective in producing and promoting research outputs. A key part of this process is the ability to recognize the developmental stage of the research and understand the likely future progression in order to formulate effective research strategies. Consequently the report examines the potential to characterize network development through identification of key phases of growth. It is intended that these outputs will enable research networks to be placed more firmly within the overall context of research capacity building.

Research success is frequently based on narrow evaluation criteria that may not provide us with information on much more than simple economic indicators of success. This report examines the effectiveness of networks and individual projects against the more complex and challenging criteria presented by DFID's sustainable livelihoods framework. By examining performance across a range of capital assets valuable information is presented that might assist in relating multiple programme objectives to the specifics of a project. In addition, the relationship between research strategy and uptake pathways is investigated in an attempt to identify improvements to impact assessment.

The outputs are aimed principally at donor agencies and organisations involved in the management of research networks. However, the results are presented in a manner that will be useful to agencies of all sizes, from small NGOs to large international research centres.

The immediate beneficiaries are intended to be donor agencies and organisations involved in management of forestry research networks who will be able to gauge more effectively the efficiency of supporting different research strategies. It is intended that intermediate beneficiaries should be research organisations involved in forestry research networks that will hopefully be able to improve the achievement of their objectives. It is hoped that the ultimate beneficiaries of this work will be the poor farmers and landless families who could benefit from an improved provision of the outputs of research.

Target institutions and individual networks and projects are not identified as the strategic nature of the findings are applicable to many different situations and types of organisations from large multilateral donors to small local NGOs.

The report illustrates that approaches to research strategy are not always determined by evidence of efficiency and that over time this can result in standardization of managerial

attitudes, which then become harder to change. The findings are intended to stimulate debate amongst donors, research managers, partners and end-users of research results about new attitudes and approaches to improve research effectiveness.

1.2 Methodology

The project has utilised the following methodological techniques to achieve its aims:

- Review of relevant literature
- Key informant interviews
- Assessment of case studies
- Workshop

The *literature review* utilised a range of documents available from libraries, colleagues and the internet. Much of the information available on networks is stored in grey rather than formal literature so a significant amount of time was spent talking to colleagues, particularly those involved in network-based research, in order to source non-formal references. In addition to using scientific and developmental literature the report utilises information on networks and knowledge management from business sources in order to broaden the experiential base from which to draw conclusions.

Key informant interviews were carried out to gain an insight into the experiences of influential individuals involved in research management. The interviews sought to provide information on issues such as successful research structures, when and where to use networks or individual projects, and improvements that need to be made to research planning and operation.

An assessment of *case studies* provided a range of examples of networks and individual projects in action. An attempt was made to include different subjects, countries, approaches to research and organisational structures. Interviews and analysis dealt with issues relating to how and why different approaches were undertaken in order to provide desired outcomes.

A *workshop* was organised jointly with the Regional Centre for Training in Community Forestry (RECOFTC) and held in Bangkok in April, 2001. Its objective was both to gain a greater understanding of the needs of a wide range of network participants from throughout southeast Asia and to test a network development model formulated by the project.

Results from all these activities are drawn together in the discussion which is intended to provide an improved understanding of the advantages and problems related to networks and individual projects. Suggestions for improvements to network management are highlighted and discussed within the context of FRP's activities.

2. RESEARCH INFORMATION PATHWAYS

2.1 The development of cooperative forestry research

By Jeff Burley[1]

Introduction

Research is not a single conceptual entity; it is a heterogeneous mixture of objectives, activities, and outputs conducted at a variety of locations by a range of institutions for a number of stakeholders and purposes with a diversity of sources of financial support (Table 1). The object of the present Chapter is to review these various factors and their interactions as a basis for identifying the values of collaboration and for stimulating cooperation to minimize unnecessary duplication of efforts at a time when resources for research are declining and the cost-effectiveness of research must be evaluated.

Components of the research process

Traditionally research requires the review of existing information, the design of appropriate experiments or surveys, the collection of raw data, and the relevant statistical or graphical analysis of these data; together these steps yield information but it requires further interpretation and judgement to use this information to make decisions on future actions. As forestry in general achieves greater public and political attention, the objectives of research increasingly need to take account of the public benefits generated by forests and the results of research need to be interpreted and presented in ways that international and national policy-makers, resource managers and the public can understand. (This has to be achieved in the current climate of increasing privatization of forestry and increasing difficulty of obtaining resources for research.)

Stages of research, development and application

Not only is research not a single entity, it is part of a continuum from the study of a particular problem, through the development of new technology that solves the problem, to the widespread application of the solution. This continuum is commonly seen as five major, overlapping steps. Some authorities consider that the research phase strictly includes only basic and strategic research while the applied and adaptive stages are included in the development process.

Together these stages constitute the resources for knowledge management: data are the observations and measurements of facts; information is the interpretation of the facts within a specific context; knowledge is awareness of the relations between objects, causes and effects; wisdom facilitates policy decisions through experience and judgement of existing and new knowledge. A workshop on knowledge management organized by Natural Resources Canada in April 2001 summarized the uses of knowledge as follows: solve problems; support decisions; reduce work; speed response; analyze issues; develop policies; improve materials; enhance technology; and predict outcomes. All of these are applicable to forest and forest products research and knowledge generation.

[1] Professor J. Burley, Director, Oxford Forestry Institute, South Parks Road, Oxford OX1 3RB, UK

Basic (pure, fundamental) research seeks new understanding of processes at the individual or population level and is commonly carried out in laboratories of advanced research

TABLE 1 *The heterogeneity of research*

Components	Design	Analysis	Information	Judgement
Steps of RDA	Pure research	Strategic research	Development	Adaptation (Application Commercializati on)
Benefits of trees and forests	Wood products	Non-wood products	Environmental	Social
Geographic locations	Global	Regional	National	Local
Stakeholders	International agencies and populations	National agencies and populations	Industry	Scientists
Research providers	Advanced research institute or university (international or national)	Less advanced institute or university (national)	Local field station or individual land owner	Company research unit
Sources of finance	International agencies	National government agencies	Non-governmental organizations (national and international) (Charities/Found-ations/Benefactio ns)	Industry
Levels of competition	Political (country or state/province)	Commercial (company)	Institutional (research institutes and universities)	Scientists (individuals or groups)
Levels of collaboration	Twinning	Multiple twinning	Networks	Cooperative centres and institutes
Types of network	Collegiate voluntary	Invitational without finance	Institutional with finance	Catalytic

institutions, often remote from the location of field problems. *Strategic research* concerns technology generation and commonly occurs at research stations; it is commonly intended to determine the technical feasibility and sustainability of specific land use interventions. *Applied research* is concerned with technology refinement and is carried out at research stations, on farms or in forests that are managed by researchers; it is intended to establish the managerial and economic feasibility of interventions. *Adaptive research* seeks the technical synthesis of technology components and their evaluation in target environments; it is also carried out on farms or in forests but with the involvement of farmers or forest managers and with broad socio-economic analysis and environmental impact analysis. The final stage of *application* requires extension training, information, financial and material

support, particularly for rural development forestry (although similar processes are required for industrial forestry development whether governmental or private).

Benefits of trees and forests

Appropriate research and development methods clearly vary between the different objectives of a given land use system and the training and traditional methods of the scientific disciplines involved. In the last decade foresters, institutions, governments and public alike have developed a wider appreciation of the multiple values of forests and trees. Forests have traditionally been recognized as the source of wood *products* (roundwood, sawtimber, fuelwood, panels and reconstituted pulp, paper and boards); there is now recognition of the need to evaluate and improve the production of *non-wood products* (food, fodder, fibre, essential oils and other extractives, and pharmaceuticals). A range of *environmental impacts* of forests and deforestation have been recognized but still require considerable research to determine the direction and value of the impacts (including macro- and micro-climatic relationships and hydrological, nutrient and carbon cycles). The *social benefits* of forests and trees are also receiving considerable attention, particularly in developing countries where individuals depend heavily on them for subsistence, marketable products for income generation, employment generation, product diversification and risk avoidance, and improved health and general welfare of humans and livestock. There is a great need for cooperation between biophysical and socio-economic scientists to solve common problems.

Geographic location

Depending on the topic or problem, research results may have application globally, regionally, nationally or locally. The pattern mirrors that of the research, development and application process discussed above. Essentially basic research has *global significance*; a specific item of knowledge about a basic process is relevant everywhere (e.g. the sequencing of a gene, the production of a taxonomic monograph, the determination of the conditions for cryogenic storage of tissue, or even the simple determination of the optimum method of germinating seed of a particular species). Such research is commonly undertaken at advanced institutions, often international or located in developed countries. *Regional relevance* applies to ecoregions rather than political regions and relates to topics or species common to the biophysical and climatic characteristics of the region (e.g. choice of species for plantation, forest-climate-hydrological relationships); again this may be undertaken or coordinated by advanced institutions in developed countries but clearly must have activity in the region. Research that has *national relevance* or *local relevance* may include all stages but is principally concerned with development, adaptation and application of technology in support of the national or local economies.

Stakeholders

Throughout the world there is increasing awareness of the need to involve representatives of all stakeholders in the research process. Research should not be conducted in a vacuum but should be aimed at solving the specific problems of the stakeholders. Particularly in the case of rural development forestry, the stakeholders are individuals and local communities, frequently poor, often disenfranchised and with little political influence. They may be the principal users of land and forests yet they are rarely consulted in designing, assessing or interpreting research.

At the *international level* stakeholders include international development agencies that fund research in support of individual countries' national development while being concerned for global impacts; too often multi-national and bilateral aid agencies do not coordinate their development efforts in a particular country and fail to achieve the benefits of collaboration in

research. Of course, the total human population is a stakeholder when topics have global impact (e.g. carbon sequestration, climate change, and hydrological cycles).

At the *national level* human populations may have different objectives from those of the world at large and national agencies are more concerned with national political and economic objectives; governments and government-funded research institutions and scientists have been the target of public attack in many countries for lack of communication about problems (e.g. BSE, bovine spongiform encephalopathy, in Britain) or the potential risks of genetic engineering (e.g. European concerns over American soya beans). Closer involvement of the public in planning and monitoring such research is difficult to implement but essential to ensure the potential benefits of the research are widely known and accepted.

In *industry* stakeholders include the owners, shareholders, management and work force of a particular enterprise. Shareholders and workers frequently have input to the management and work ethic of the company but rarely have direct concern with research activities. *Scientists* have direct interest as stakeholders in research itself as professionals and employees; depending on their institution they may have greater or less participation and representation in the research planning and monitoring process. Their personal interests and survival instincts may not give them an objective view in comparing different research topics or in evaluating their own subject's importance but they have a real role in evaluating the feasibility and potential of their research.

Research providers

There is equal diversity in the nature, location, size and value of institutions that undertake research. *Advanced institutes and universities* are located primarily in developed countries for historical and economic reasons but many developing countries are increasing their scientific capabilities rapidly. Such institutions are best able to conduct basic and strategic research and associated training. Some of the most outstanding in the natural resources field are the International Agricultural Research Institutes of the Consultative Group for International Agricultural Research, principally located in tropical countries; they include the most recently created centres CIFOR[2] and ICRAF [3] who have global mandates to conduct, coordinate and stimulate research in developing countries through networks, training and information.

Less advanced institutions and universities occur in developed and developing countries where they conduct some basic research but considerably more strategic and applied research with local focus. The coordination of their activities is often attempted by national government committees and councils to minimize duplication and the waste of limited resources. Much of the field research of such institutions is carried out on local *field stations* or on the land of *individual land owners* who are thus seen as research providers. The fourth group of providers is the *company research unit*, usually dedicated totally to the strategic problems and practical objectives of the company with declining resources for external support or “blue-skies” research.

Sources of finance

Research providers are not necessarily research financiers. Most research institutions have to compete for external finance as core funding, particularly from governments, declines; the

[2] Centre for International Forestry Research, Bogor, Indonesia.

[3] International Centre for Research in Agroforestry, Nairobi, Kenya.

increasing privatization of forests and forestry implies also that research should be funded privately but there is a marked disinclination among many of the newer stakeholders to agree to finance research that has previously been provided by government.

International agencies (development banks, funds and multilateral agencies) do fund research but as a very low proportion of total gifts or loans, particularly in long-term enterprises like forestry. *National government agencies* throughout the world are tending towards privatization with fewer resources available for public goods and services including research; within the forest sector country expenditures on research vary from 0 to 10% of sector income. *Non-governmental organizations* including charities, trusts and foundations are increasingly supporting research; some were established specifically for that purpose (e.g. the Wellcome Trust for medical research) and others have been prime supporters of agricultural research and development in developing countries (e.g. Ford and Rockefeller Foundations). *Industry* support for research also varies from 0 - 30 per cent depending on the nature of the company's product and the size of the enterprise, with the highest proportions currently allocated in biotechnology and medical technology. There is increasing use of combinations of funding perhaps best exemplified by the Cooperative Research Centres (CRCs) and the Forestry and Wood Products Research and Development Corporation (FWPRDC) in Australia where forest research is financed and conducted collaboratively by public research institutions, universities, private industry and state forestry institutions. The model forest programme in Canada involves many stakeholders in all aspects of the management of identified forests, including research.

Benefits of collaboration

Several major sets of benefits arise from collaboration, most of them occurring at political, commercial, institutional and individual levels. For major projects the *costs, risks and capital equipment* may be shared; not every collaborating organization requires a mass spectrometer, a DNA sequencer or a high level meteorological tower, provided that adequate access at reasonable cost may be assured to all the partners. Material may also be shared with lower overall costs; examples include the classic joint collections and sharing of seed for international provenance trials that have been the hallmark of CSIRO[4], CTFT[5], DTSC[6], FAO, OFI and many IUFRO Working Parties for 50 years or the genetically improved material resulting from some cooperative breeding programmes (e.g. the North Carolina State-Industry Tree Improvement Cooperative).

Land and laboratories may also be shared, particularly where expensive or space-demanding experiments are concerned or where information is sought on the interactions between experimental treatments and site. Commercial companies have for many years collaborated in creating or supporting high technology research institutions (e.g. the several national pulp and paper research institutes in Canada, Germany, Sweden, UK and USA); collaboration at this level is commonly on topics that are seen as pre-competitive and currently these include enhancing energy efficiency, improving environmental controls, pollution reduction, development of technologies for genetic engineering, and the propagation of improved plant material. However, gene patenting may well prejudice such collaboration.

As the costs of research increase and government funding in particular decreases, a major advantage of collaboration is to obtain the *critical mass of staff* necessary to obtain the

[4] Commonwealth Scientific and Industrial Research Organization, Canberra, Australia.

[5] Centre Technique Forestier Tropical, Montpellier, France.

[6] Danish Tree Seed Centre, Humlebaek, Denmark.

intellectual interactions that address problems adequately. Individual institutions are being forced to reduce staff and consequently to specialize on narrower topics but many problems require *inter-disciplinary approaches*. It is particularly necessary in rural development research to encourage collaboration between the “hard” and “soft” sciences so that the socio-economic needs and impacts of technological change can be established.

Underlying all these benefits is the sharing of information and expertise, thus reducing unnecessary duplication of efforts. Scientists, including graduate research students, have traditionally published their results in journals as soon as possible to achieve recognition for the first discovery. Once in the public domain the information can be capitalized by anyone. A vast amount of information has been published but is often not known or available, particularly in developing countries; libraries such as the Oxford University Forestry Library for world literature may hold the resource but it is only of use if users can access it. Abstract services such as CAB International's Forestry Abstracts and Forest Products Abstracts or the Pulp and Paper Institute’s Pulp and Paper Abstracts make such information more widely available, particularly since electronic forms have become used, but for specific topics collaboration between active researchers is the most rapid way of distributing current progress.

Types of collaboration

Collaboration occurs between institutions and individual scientists in various forms and at different levels of activity and benefit. *Simple twinning* between two institutions or *multiple twinning* between several institutions provides the easiest method of exchanging ideas, methods and materials for particular research and may be formalized through institutional memoranda of agreement or informally through personal agreements. Twinning has been used frequently to provide technology transfer between institutions in developed countries and those in developing countries, involving exchanges of staff, students and publications, and donations of equipment.

A more wide ranging type of collaboration is *networking* in which several organizations share activities and other contributions to attain common goals.

Types of network

Neurobiologists, information technologists, electrical engineers, communications specialists and business managers have their own definitions and structures of operating networks. In research, particularly forest research, four major types of network have been established. The *collegiate voluntary* network is represented by the traditional IUFRO Working Party in which enthusiastic leaders have established a body of individuals in different countries who agree to pool their personal talents in addressing particular problems, often exchanging research material and frequently holding conferences with subsequent publications. As a non-governmental, voluntary, international Union, IUFRO has created hundreds of collaborative research units, disseminated results through conferences, publications and training courses, established standards, protocols and terminologies for research, and brought research to the attention of governments, inter-governmental agencies, international processes, and the public.

Many industrial companies have also benefited from these collaborative efforts, especially in pre-competitive research; it must be accepted that, in market economies and in the present international economic environment, competition is inevitable but all organizations should re-evaluate the costs and benefits of collaboration at all stages and levels of research, development and application. In many cases collaboration and competition need not be mutually exclusive.

The *invitational network* without financial support other than for the coordinator is typified by the early CSIRO, DTSC and OFI networks in which aid agencies funded the coordinating institution but provided little or no finance for the collaborators who had to fund the field research themselves; the coordinating institution did, however, provide material, guidance on experimental protocols, centralized statistical analysis, taxonomic identification and information services.

The *institutional network* with financial support has become more common; the type is used by many donor agencies and particularly international agencies such as CIFOR and ICRAF; research needs are identified through a process of appraisal and research plans are drawn up by multidisciplinary teams representing the agency itself and research institutions from each participating country. Again, combined analysis of data, joint workshops and training courses, and centralized information and advice are provided by the organizer.

The *catalytic* network is the most recent form and used by IUFRO's donor-funded Special Programme for Developing Countries. In this IUFRO acts as the catalyst for establishing networks but has no direct research activity itself although it organizes regional planning workshops with research leaders from national institutions.

Inhibitors of collaboration

Competition is the direct opposite of collaboration and is the striving or vying of two entities to gain the same objective or object. Humans have always competed with other organisms and with each other for mates, land, food, possessions, wealth, athletic and academic superiority, reputation, ecological niche and total survival. In the context of this report competition in research may occur at national governmental, commercial, institutional and individual scientist levels (see Burley, 1999). In all but the first competition may sharpen intellectual and practical focus but has the disadvantage of operating in a vacuum of secrecy and loses the opportunity for the positive interactions of collaboration.

However, despite the apparent advantages of collaboration there are a number of factors that militate against it. Collaboration may be seen as a *threat* to the security of a country, to the comparative advantage of a company and institute, and to the personal fame or reputation of an individual scientist. It is in the nature of our *traditional behaviour* that nations have political animosities and companies guard their commercial secrecy to protect their comparative advantages; research institutions tend to concentrate on a limited range of topics and to take a uni-disciplinary approach while scientists, particularly in universities, traditionally seek academic freedom with some secrecy.

The four levels have antagonistic *perceptions of collaboration*; in many if not most countries, and in some states or provinces, there is a nationalistic or chauvinistic suspicion of others. Collaboration among companies offers opportunities for industrial espionage. Research institutes and individual scientists frequently lack trust in potential partners and believe they would not offer equity in intellectual or financial input.

Legal inhibitors include anti-trust legislation that prevents the development of monopolies for the public good yet inhibit research collaboration that would be in the companies' interest and possibly in the public interest overall. Intellectual property rights have long been a major concern of companies (through the patenting and licensing system) but they recently have become important to research institutes and scientists. *Financial inhibition* to collaboration occurs when the sharing of profits or the overall costs of cooperating exceed the perceived benefits. The true costs of establishing and maintaining cooperation are often grossly under-estimated.

Many government institutions and industrial companies have benefited from collaborative efforts, especially in pre-competitive research; it must be accepted that, in market economies and in the present international economic environment, competition is inevitable but all organizations should re-evaluate the costs and benefits of collaboration at all stages and levels of research, development and application. In many cases collaboration and competition need not be mutually exclusive.

A brief history of collaborative forest research

The International Union of Forest Research Organizations (IUFRO) is arguably the oldest international collaborative research organization and is a good example of the development of cooperation in research. IUFRO was formed in 1892 following a recommendation of the Congress of Agriculture and Forestry in Vienna during 1890 to create a "central organ" for applied forest research in European countries. All forest experiment stations were invited to join the Union but initially only Austria, Germany and Switzerland were founder members. By the turn of the century other European countries had joined together with Japan. At the start of the 20th century some were "corresponding" members but by the start of the 21st century 700 member organizations from 112 countries had joined with full membership (although many of those in developing countries find it difficult to pay their membership fees in hard currency).

Even at the founding of IUFRO, the idea of international cooperation in forestry was not new. The great floods that haunted central Europe in the 19th century had given rise to a call for international forest protection law and, although the legislative aspirations were not attained, extensive forest meteorology studies were conducted bringing about close cooperation between scientists in many countries. Lively debate and international exchanges of views took place on the influence of forest on climate.

The objective of the Union was to provide for the exchange of experience and knowledge in the new branch of applied forest research whose workers were mainly in the field rather than in the university forestry departments that already had traditional means of exchanging information through journals and conferences. In the first half of the 20th century collaborative research focussed on the following major subjects:- investigation of the relations between forests, climate and water supplies; evaluation of provenance variation within indigenous species, particularly Norway Spruce, Scots Pine, European Larch and Oak; investigation of exotic tree species, largely American and Japanese species introduced into Europe; the development of the scientific underpinning for harmonized rules on international seed exchanges; evaluation of methods to convert pure stands to mixed stands; establishment of experiments on thinning, growth and yield; study of the impact of the weather on tree increment; evaluation of the technical properties of wood. The value of the cooperative nature of IUFRO was the agreement on experimental protocols for design, measurement, analysis and interpretation of the results.

After the Second World War, IUFRO expanded in numbers of members and in coverage of subjects, species and countries. Cooperative research developed through Working Parties and Subject Groups concerned especially with general forest influences on the environment and economy; silviculture and management; forest plant science and conservation; forest protection and entomology; forest policy and economics; forest products, properties and technologies; and operational efficiency.

In the last quarter of the 20th century great efforts were made to bring the benefits of IUFRO's collaborative research to scientists and institutions in developing countries and to increase attention to social values of forests, policy issues and public information on forest science.

In addition to direct experimentation, IUFRO members cooperated in:- creation of an international bibliographic centre for forestry; international seed exchange; agreement on standard methods and units of measurement; preparation of manuals for site description, provenance testing, fertiliser experimentation, wood testing, and the harmonization of growth and yield investigations; and development of the Oxford system for decimal classification of forestry literature. One of IUFRO's Task Forces is currently a major collaborator in the creation of the Global Forest Information Service.

With its voluntary collaborative approach to common scientific, managerial and political problems, IUFRO became a model for research cooperation particularly through the networking of its Working Parties and the twinning or multiple twinning approaches of its Special Programmes. Many other agencies and organizations concerned with agriculture, fisheries, horticulture and other natural resources have evolved networks to seek the solution of common problems or the improvement of particular species and techniques; FAO alone recognizes over 100 research and development networks in its own fields while many international agencies, national organizations providing global services, and individual companies have established cooperative networks especially for species, provenance and breeding research.

Early in the 21st century it is apparent that forest research faces a number of challenges (Burley, 1997) the response to many of which will be enhanced through international collaboration. First, research must be innovative and produce timely and relevant knowledge, information and technologies for current and foreseen global, national and local issues. Second, much research should be interdisciplinary and mission oriented. Third, the results of research must be disseminated in different formats for different clients including policy makers, resource managers, peer scientists, land using communities or individuals, and the public at large. Fourth, research must be related to existing information. Fifth, research in tropical and development countries must be facilitated through institutional and human resource development, technology transfer and finance. Sixth, research must be adequately supported and fully accountable. Seventh, research requires political will; this latter does not itself result from collaborative research but the results of such research, if adequately presented to the public and to policy makers, can influence policy decisions.

2.2 Research information pathways

Introduction

Organisations involved in overseas development are increasingly recognising the limitations of current approaches to managing the flow of information created from research results. Donors are often keen to fund dissemination activities for publicity and awareness-raising but many are not skilled at getting the right information to where it can actually be used. Lack of uptake of research findings, particularly amongst the poor, leading to the inevitable loss of impact, is acknowledged as a major problem in justifying future research activities. One of the most significant issues in attempting to improve this situation is gaining a greater understanding of where and how information is turned into knowledge and how this is transferred between different levels in the research process. Increased clarity of these processes will, in turn, provide indications of which situations should be addressed by networks and which by individual projects. The uncertainty surrounding appropriate approaches to knowledge management has, in some cases, led to stagnation in development of information flow from researchers to end users. In many cases the characteristics of the top-down approach to information generation and sharing that have been so widely recognised as detrimental to achieving impact of research results remain prominent features of current research programmes.

Saywell and Cotton (1999) identified that a major problem in achieving better utilisation of research results is the general lack of understanding of user perspectives when considering dissemination of outputs. They felt that little consideration is generally given to the views of NGOs, CBOs, governments and other development organisations concerning needs, problems, constraints and priorities regarding dissemination of research. This failure to understand what information is required is frequently compounded by a limited knowledge about what is already known of poor people's information and knowledge systems. Questions need to be asked about the information needs of the poor, their information priorities, how they receive information, the key individuals in the process, how information is taken up, and how scientific information becomes retained as knowledge within a community. This means that it is essential to understand as fully as possible not only the information that is being transferred but also the most effective means of carrying out the transfer. As Swann et al. (1999) highlighted in their review of business networks, knowledge cannot be communicated, understood or used without knowing the subject. Bernard (1996) suggested that finding the answers to many of the questions with which research managers are presented depends on a better understanding and management of interpersonal exchange and joint learning potential. In other words, a clearer understanding of the means by which information is turned into knowledge is required along with a careful analysis of how the two are communicated.

All these issues are central when attempting to gain an understanding of how to improve information flow to end users of forestry research results. However, the focus on delivery of information to farmers obscures the equally important but less well documented issue of how information is managed within organisations in the production and uptake process. It is often assumed that problems in uptake of information are caused by obstacles that arise in the extension process. However, assumptions of effective information management within organisations need examination in order to inform choices surrounding the research process itself.

Information and knowledge management

Although some of the definitions surrounding information exchange may appear obvious at first it is worthwhile considering what we mean by knowledge and information if we are to look at how they appear and flow within networks and individual projects. In their review of forestry information and knowledge management, FAO (2001) define *information* as data organised and arranged to serve a need and *knowledge* is defined as the sense and use people make of information. Knowledge is seen as a fluid mix of experience, values, contextual information and expert insight that provide a framework for evaluating and incorporating experience and information into action. It is generated when people understand and accept research results; and knowledge contributes to change when people apply it (Sander 1998). Information combined with the human experience becomes knowledge (Figure 1).

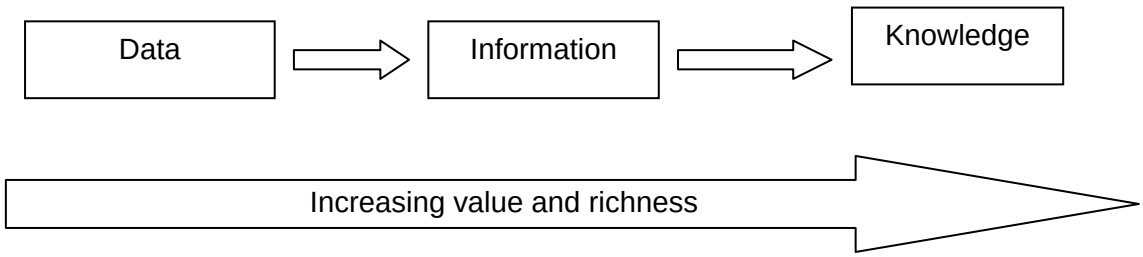


FIGURE 1 *The relationship between information and knowledge in forestry. (From FAO 2001)*

The term 'knowledge management' (KM) is becoming more common throughout science as researchers and policymakers attempt to expand their boundaries and learn from the business world. While KM does not have a strict definition within the forestry context FAO (2001) suggest it can be considered as the systematic acquisition, synthesis and sharing of insights and experiences to enable success.

Existing knowledge transfer systems

Two types of knowledge are generally recognised: *explicit* and *tacit (or implicit)*. The former can be seen as stored in systems that are easy to utilise and therefore relatively easy to transfer, while the latter is often held by individuals or communities and as such its transfer is often difficult and culturally dependent. While it is often easier to categorise knowledge as either one or the other Dixon (2000) cautions us that we should be careful to recognise that knowledge is a continuum: at one end knowledge is laid out in procedures, steps and standards (explicit) while at the other end is knowledge that is primarily in the heads of people (tacit/implicit).

The appreciation of different knowledge types and the suggestion that particular strategies may be needed to assist their transfer within the overall uptake process has not been widely explored in forestry research. However, business literature deals more fully with these ideas. A first step in understanding how to support effective KM through different approaches to research is to examine the various types of knowledge transfer systems that exist. Beeby and Booth's (2000) review of inter-organisational learning revealed four types of knowledge transfer system that exist between individuals or groups. Each is described briefly below and modified to relate to a forestry research context.

1. *Socialization* – refers to sharing of tacit knowledge between individuals (informal communication).
2. *Externalization* – refers to the conversion of tacit into explicit knowledge through a process of codification in order to formalise outputs and ensure widespread dissemination (semi-formal communication, for example group meetings or workshops).
3. *Combination* – refers to the dissemination of already explicit information to other levels of the organisation of networks and or organisationally held knowledge to individuals and teams, primarily through information systems (dissemination of research results to implementers of results).
4. *Internalization* – highlights the conversion of explicit knowledge at organisation or network level into tacit knowledge at team or individual level (distribution of research results to policy makers).

Recognising that different types of knowledge transfer system operate at different levels provides a basis for identifying the different inputs that are needed in order to encourage information flow. Collaborative research must aim to understand and utilise both knowledge types and knowledge transfer systems in different situations. FAO (2001) considers networks and networking as the best way to develop effective knowledge management because "the network approach distributes ownership, responsibility and accountability for information closer to the user groups within a community of practice led by national institutions". However, their justification is characteristically idealistic and lacks analysis of alternative approaches to research management. If we are to pursue a strategy based on either networks or individual projects we need to know how each approach influences, or is influenced by, knowledge transfer mechanisms.

Improving information flow

Knowledge flows around a network or an individual project operate in two ways: within and between management levels. Scientific research aimed at rural development is by its nature open and collaborative and consequently the examination of information flows have tended to focus on interactions between organisations. A converse situation generally operates in business where the inherent lack of inter-organisational collaboration and fierce protection of intellectual property mean that reviews of KM are usually restricted to operational performance within a single organisation. It is becoming increasingly clear in both science and business that identifying effective KM strategies requires careful analysis of learning

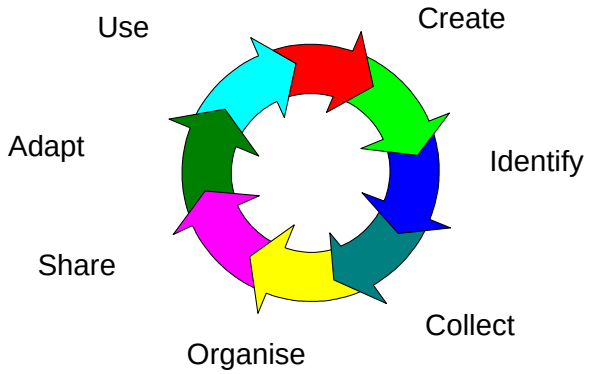


FIGURE 2 *Knowledge management within a forestry organisation (From FAO 2001)*

processes and knowledge transfer both within and between levels (Beeby and Booth 2000, Dixon 2001).

Current thinking in business KM suggests that organisational learning is a cyclical process comprising distinct activities. Although this concept has its limitations when attempting to transfer it to a developmental context it nonetheless indicates two important principles. Firstly, that there are clearly identifiable components in the creation, absorption and utilisation of knowledge and, secondly, that it is a continual process. This view of a cyclical process of KM within groups is shared by FAO (2001) and illustrated in their representation of knowledge generation and movement within organisations involved in forestry research (Figure 2). However, information and knowledge that is generated at one level in an organisation tends to stay there unless there action is taken to assist its transfer to other levels (Saywell and Cotton 1999). A review and analysis of KM networks in business undertaken by Beeby and Booth (2000) led them to conclude that assisting the flow of knowledge between management levels is possible but requires an understanding of two key factors

- Recognition of the different levels within the organisation
- Identification of the manner in which learning takes place within each level

Dixon's (2001), in her analysis of how large organisations in both the public and private sector transfer information in order to create "common knowledge", shares the view that understanding the relative position of individuals and groups within an organisation is essential for effective KM.

Although the specific hierarchical structure of activity within a research programme does not affect the principal of the importance of the interrelationships in knowledge transfer it is helpful to refer to a hypothetical structure in order to discuss concepts further. The hypothetical structure used in this report consists of four levels chosen to represent typical groups that are present in most networks and many individual research projects. The levels are donor/policymaker, coordinator/scientist, NGO/extension agent and farmer.

These levels are represented in a model of KM within forestry research based on Beeby and Booth's (2000) concept of cyclical learning within levels (Figure 3). Their suggestion that the learning process at each level within an organisation is essential similar, consisting of stages of experiencing, processing, interpreting and taking action has been modified to take account of the differing roles that each level plays in the overall research structure. This has meant recognising that the relative importance of the different parts of intra-organisational learning is determined by the relationship of each level of management with the others. For example, while the role of processing knowledge is essential at each level it is of greater importance to policy makers than farmers in relation to the other aspects of KM.

While it is important to the overall flow of information in a project to appreciate the role of the different intra-organisational levels of KM, the objective of this study is to focus upon the overall research structure and as such to analyse inter-organisational relationships. In this respect the model attempts to show how knowledge moves within and between levels both in terms of the *type* of knowledge transferred and the *process* of transfer.

The main implication of this model is that information flows are different at different levels, both in type and degree. Transfer of tacit and explicit knowledge varies between the various levels depending on the knowledge generated by the different groups and their ability to assimilate it. Knowledge transfer systems also vary from socialisation in the sharing of tacit knowledge between farmers to the process of internalisation used by policy makers in distribution of project implications.

The model illustrates that donors and policy makers operate mainly with explicit knowledge and transfer it by means of dissemination and policy decisions to coordinators/scientist, and to a much lesser extent NGOs/extension agents. Coordinators/scientists link to all other levels, using the transfer of both tacit and explicit knowledge. The model illustrates the essential role that NGOs/extension agents play in KM in forestry. They form the main link with farmers in terms of both receipt of tacit knowledge held by farmers and delivery of explicit knowledge received from other levels. The importance of farmers' transfer of tacit knowledge between themselves and with other levels through socialisation and externalisation is also indicated.

An additional type of knowledge transfer is illustrated in the diagram by the transfer of explicit knowledge by consultants to various levels. This type of interaction is referred to as 'expert transfer' by Dixon (2001) and is distinct from the other levels for two reasons. Firstly, because it is not always present, and secondly because it is entirely one-way. It represents the necessity of knowledge outside the scope of the project and is usually provided by someone who does not have a long-term role in the programme.

The model is designed to give an overall representation of the relationships between different levels in a system of collaborative research and to show that interactivity and feedback between different levels of networks and individual projects is essential if research results are to have any impact (Saywell and Cotton 1999). However, the model indicates that most learning and communication is linear or between adjacent levels (e.g. contact between individual NGOs and farmers, or between scientists and donors) rather than horizontal and multi-directional (e.g. workshops where all levels of the network attend). In Bernard's (1996) review of IDRC's networking activities she agreed that information flow between individuals is most common within one level rather than between levels in a research organisation and that one of the main challenges facing research planners is how to encourage communication between levels. Within the world of business management the benefits of a reduction in the hierarchical levels were highlighted in Marschan et al.'s (1996) review of the general trend in Multinational Corporations (MNCs) towards greater decentralisation. They found that increased communication led to the development of "networks of personal relationships that work through informal, horizontal communication channels". Interaction between different

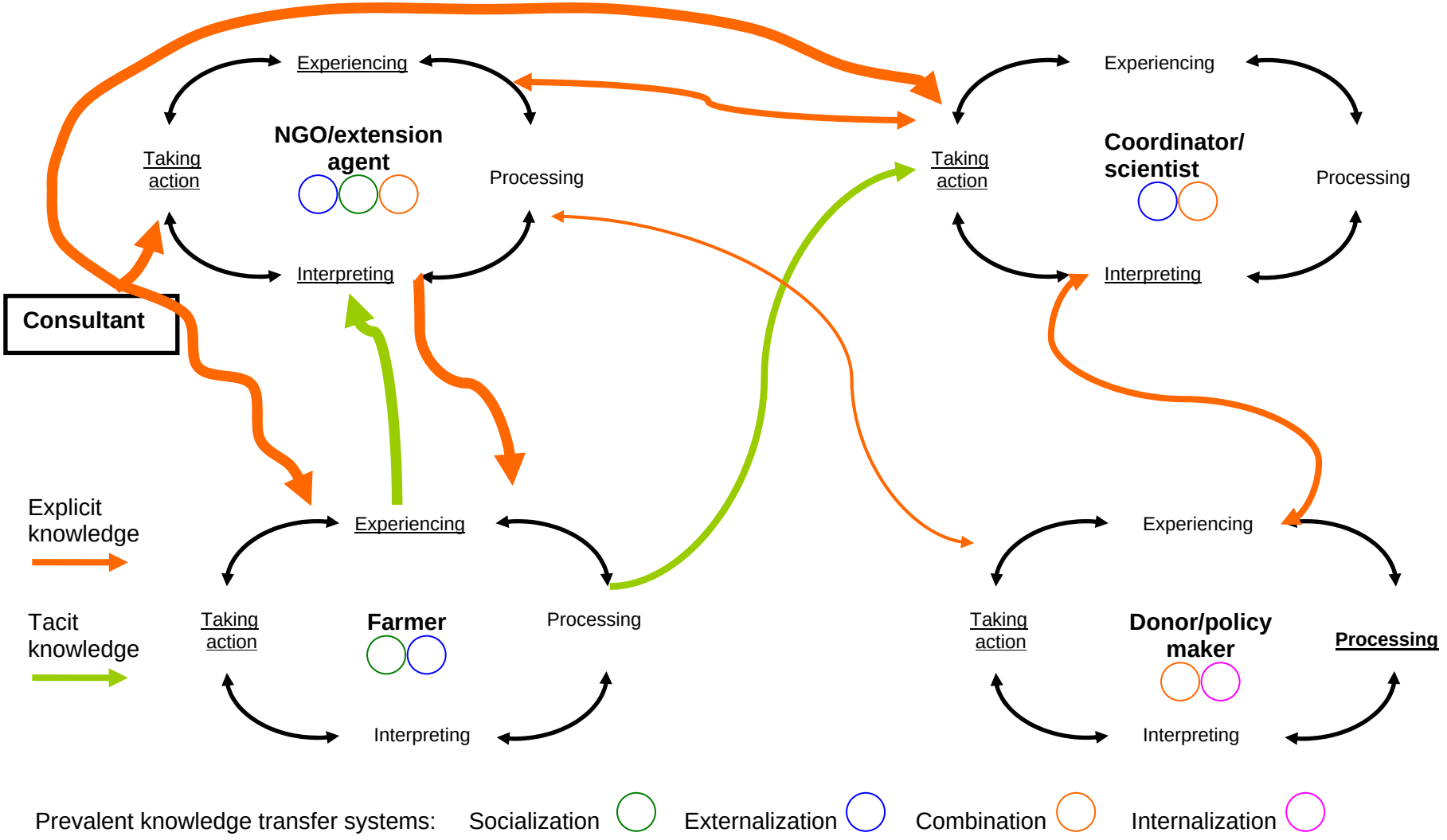


FIGURE 3 *Illustration of knowledge management and knowledge transfer systems within a hypothetical forestry research project*
(Underlining represents a focus of effort/experience within components of the learning process)

levels within a network or individual project suggests that there may be scope for either increasing the role of knowledge transfer through externalisation or developing the role of key individuals who work across several levels. In their analysis of the role that networks can play in organisational learning Beeby and Booth (2000) refer frequently to the need to focus on individual rather than inter-organisational relationships as the most influential means of encouraging information flow throughout the organisation. The importance of key intermediaries as interpreters of research results is particularly important in the link between scientists and farmers in the adaptation of research findings to the local context (Saywell and Cotton 1999). Stickins (2001), in his review of regional and sub-regional agricultural research organisations, points out the key importance of the link between research organisations and their partners, NARS, in achieving delivery of results. Likewise, IARCs do not have a mandate to deal directly with farmers (Sechrest et al. 1998). They too consider this to be the responsibility of the NARS**.** A critical part of the adoption process for the IARC's is their relationship with these "intermediaries" and their ability, in turn, to create a bridge between the research and farming communities. These examples confirm that the complexity of the relationships between the multitude of players at different levels has to be recognised if information is to flow successfully. It is essential to build an environment that fosters sharing, advising and learning at all levels, if the organisation or network is to operate successfully. Too frequently we see management structures in research that do not provide adequate encouragement or facilities for those who create new information to share it with others, at whatever level.

Research organisations frequently fail to appreciate that individual and organisational successes are intimately bound. The fact that encouraging information flow is a concept more widely recognised in private enterprise than is generally the case in academic and developmental circles is perhaps understandable. Closer links between organisational performance and profit, or availability of financial support, inevitable create greater incentives to improve efficiency. As such, business literature provides useful indications of the importance of encouraging information flow. Swann et al (1999) highlight the crucial link in organisational learning between knowledge held by an individual, or one component of the organisation (e.g. an NGO), and their ability to share it. The importance of the information flow to the success of the whole organisation is confirmed by Locke and Jain in Beeby and Booth (2000) but they caution that a number of factors can prevent individual learning from spreading to the rest of the organization. These include organizational policies and procedures and the lack of a critical mass of people with new skills and knowledge and the ability to work together for change. While their suggestion for overcoming this problem is to increase the number of individuals involved in knowledge management it may be more appropriate in many cases to instigate KM systems or simply improve those already present.

Comparing networks and individual projects in terms of KM

In order for a research programme that relies on information flow to operate effectively it is essential to recognise the key factors that influence KM. Dixon (2001) identifies three key components that determine how a knowledge transfer system will work in a particular situation:

1. the type of knowledge
2. the nature of the task
3. the receiver of that information

None of these is determined by the research structure *per se*, and each could be managed effectively within either a network or individual project. The importance of factors that lie outside the overall research structure to KM is confirmed by Saywell and Cotton (1999) who consider that constraints to effective dissemination are determined by two types of barriers**:**

those which prevent researches from disseminating their work (time, resources, perception of dissemination) and barriers to the application of research (institutional disincentives, lack of interest from policy makers). Once again, the existence or importance of such barriers appears to be independent of the research structure. However, Lawrence and Warren's (1999) findings from an assessment of researchable constraint in participatory forest management suggest that the framework within which research is conducted may have a profound influence on its level of success. They found that the ability to communicate between management levels was regarded by stakeholders as the main constraint to progress. This suggests that the ability of networks or individual projects to support communication may be the most important factor that should influence their selection. This agrees with the findings of Kowal and Padilla (1998) who found that the presence of intermediary agencies and their attributes were crucial in determining the level of success of farm forestry projects carried out in Honduras.

The ability of knowledge transfer mechanisms to determine the success of inter-organisational KM highlights the importance of the extent (or range) of contacts and the strength of relationships between partners. While it would appear that there is nothing inherent in the structure of networks and individual projects that determines success at KM there are characteristic features of the two approaches that tend to influence the process.

Networks

A characteristic of networks that is examined in more detail in section 2.4 is their ability to incorporate a wider range of partners than is often the case with individual projects. This has two benefits: firstly in the *extent* of knowledge pathways that can be established and secondly in the *expertise* required to make them work. Networks are often able to capitalise on their size by creating more linkages at all levels, thereby increasing the options for knowledge transfer. Saywell and Cotton (1999) suggest that a principal feature of networks is their ability to forge new contacts and thereby cross institutional boundaries. In addition, the range of skills required in effective KM may be beyond the scope of an individual project. The typical structure of networks with many partners can often encompass a better range of skills, for example in the fields of communication, adoption, dissemination etc. For example Norrish and Lawrence (1997) refer to the range of different knowledge transfer systems that exist within farmers' information networks in south and southeast Asia, and highlight the importance of utilising each approach to encourage overall success of the programme.

Individual projects

An advantage of employing individual projects is that contacts with partners exist already and may therefore already act as effective channels for knowledge transfer. This is particularly important when considering the policy objective of the funding agency towards institutional learning. An objective to strengthen knowledge and KM systems within a particular organisation would suggest focussing on supporting individual projects. Conversely, an objective to support KM systems within a regional context would tend to favour networking.

The implication of this is that there are differences between networks and individual projects that make them applicable to certain types of projects seeking to enhance KM. However, the enormous diversity amongst networks and individual projects and the complexity of the KM process means that it is not possible to select between the two approaches based on simple criteria. Such a choice can only be made following careful examination of the project in question through evaluation of existing and potential relationship between participants, identification of the existing approaches to information flow within and between management levels, highlighting current knowledge transfer mechanisms, understanding the objectives of the donors, determination of the type of knowledge to be transferred and clarification of the options for resources inputs.

2.3 Assessing research success within networks and individual projects

In order to decide whether, or in which conditions, forestry research is more successful when conducted as part of a network or an individual project it is essential not only to have a clear basis upon which to evaluate success but also to be able to understand the linkages between cause and effect that operate within both.

Definitions of research success

Research success is generally measured in terms of outputs, outcomes and impacts. Research and development programmes have traditionally relied on *outputs* as adequate measures of success largely because they are generally quantitative in nature and relatively easy to measure. However, many projects that measure their progress against outputs, particularly those that emphasise an experimental base, fail to address either the inherent value of the research output or the fundamental aspect of how those outputs are delivered. In some cases this narrow view of evaluation is based on an assumption that there will be further follow-up work designed to look more closely at uptake and impact. But, given the generally short-term nature of research funding it is not always possible to continue with research programmes, leaving some initiatives without a clear means of connecting with end users of research results.

The shortcomings of traditional output-based targets in natural resources programmes characterised by producing a “bigger pile of rice” or planting more trees have been brought into focus over the last 10 years by the general demand for greater accountability in development spending. Improvements to the process of providing valuable research outputs to the chosen target group requires not only an analysis of what achievements are planned, but also an examination of the research and adoption structures that will optimise this process.

The terms outcomes and impacts are frequently used interchangeably, due mainly to confusion over their meaning. *Outcomes* are usually considered to be the result of project outputs and their assessment is often considered to be of limited value as they do not necessarily reflect change. *Impacts*, can be most simply defined as the difference between what has happened as a consequence of the research activity and what would have happened anyway (Spilsbury pers comm.), and can be thought of as the product of the effects of uptake and the amount of uptake (Franzel et al. 2000). . A such, they refer to the broad, long-term economic, social and environmental effects resulting from research. Impact can also be considered as the extent to which research has not only succeeded in providing a solution to a problem but also the extent to which solutions are adopted and benefits accrue to the users (Kowereo and Spilsbury 1997). Such effects may be foreseen or unforeseen, positive or negative, and generally involve changes in both cognition and behaviour (CGIAR 2000). Although measuring impact, whether directly or indirectly, may prove difficult it reflects the most meaningful measure of the value of the research and has therefore spawned a substantial literature focussing mainly on environmental and, more recently, social development issues.

Linking actions and outcomes

Forestry research takes place in a complex environment in which the relationship between cause and effect is often difficult to establish. Attribution of impact to the activities in which resources are invested can be complicated and is frequently misdirected. This is particularly true when research structures are multi-layered and there are many stages between carrying

out research and identifying impact. Even in situations where causal links are more obvious it is often difficult to attribute meaningful measures of success to any particular action. The difficulty in being able to identify such links between 'front end' research and development impacts has been recognised as a cause of project failure by many donors including the World Bank, Asian Development Bank and a number of major bilateral funding agencies (Rothschild 2000).

Indicators of success

The problem encountered by donor agencies who are increasingly interested in indicators of livelihood improvement is that the target group is usually several steps away from the research output (whether this is a physical output, a management tool or a policy). Deciding on appropriate indicators of research success is made more difficult by the range of organisations and partners that may be involved in facilitating and using the outputs of research. The result is that intermediate goals such as new technologies and improved productivity which are more easily measured are frequently used as indicators of research impact. However, the focus on such intermediate goals not only reduces our understanding of impact pathways but ultimately leads to inappropriate focus of research effort. It is essential that there is a clearer understanding of the uptake pathways that exist between research 'producer' and 'consumer' within different research structures, such as networks and individual projects, if uptake and impact are to be improved.

Impact indicators are needed that provide feedback on success at different levels and over different time periods. This in turn will indicate the success of different research structures. In addition, it must be possible to identify positive as well as negative impacts. This may mean considering more carefully the impact of the research to stakeholders outside the intended project catchment.

Identifying causal agents of impact is dependent upon identifying appropriate indicators of research success. In many areas of forestry research and development suitable indicators of success are lacking with the result that there is an overdependence upon quantitative indicators (Kowero and Spilsbury 1997). Impact assessments in natural resources research have tended to focus on measuring direct economic costs and benefits and there are very few studies that incorporate social and environmental costs and values in to the calculation of net benefit[7]. However, while it might appear that this is a worrying situation for forestry research given the generally low rate of return that is a characteristic of most developmentally-based forestry projects there are cases where assessing economic return on investment provides surprising justification for supporting research activity within the natural resources development sector. For example, a review of "fodder bank" technology developed by ILCA and reported by Elbasha et al. (1999) indicated that on an expenditure of research resources of just over US$ 7 million, the total net benefits to society that had accrued up to 1997 amounted to US$ 16.5 million, with an internal rate of return of 38%. Furthermore, the extensive work carried out by ACIAR to investigate the impact of its funded research projects provided ample justification for research investment across the natural resources sector (Davis and Lubulwa 1995, Lawrence 1995, Menz and Lawrence 1999). Although the only forestry project included in the evaluation was concerned with introduction and cultivation experiments for Australian broadleaved species in China, where the benefit: cost ratio was 56:1, research projects in other sectors illustrated equally striking rates of return on investment (Lee 1992, Menz and Lawrence 1999, Anthony 1994). These examples provide interesting insights into reasons for success. Although the literature does not yet provide enough comparative examples of non-economic evaluations, and the examples

[7] The prevalence of economists at the CGIAR meeting on impact assessment (CGIAR 2000) appeared to strengthen the view that measures of financial capital supersede all other indicators of impact (Watts pers comm.).

above may be exceptions even within their own research portfolios, it is tempting to consider commonalities between them. Both ILCA and ACIAR are large, well-resourced organisations that are familiar with management of complex research networks. As such their ability to capitalise upon the inherent strengths of networks in terms of reach and diversity of end-users may not be easily transferable to smaller organisations.

In a review of impact assessment in forestry research, Henderson (1999) found that most of the assessments of impact were been heavily biased towards industrial forestry. Natural forest management, farm forestry and agroforestry research were barely represented in the published literature while those evaluation studies that were located focussed on Net Present Value (NPV) or the Internal Rate of Return (IRR) as their principal means of measuring project worth.

While economic indicators may provide guidance on which projects provide the best rates of return they provide little if any insight into projects that give a higher priority to non-market values. Forestry research is increasingly aiming at providing a wide range of social, financial and environmental benefits to a diverse group of stakeholders and in order to estimate the broad level impact a wider range of indicators is needed than is currently used in most evaluation programmes.

Impact assessment in networks and individual projects

Impact assessment is generally carried out to measure success and assist future planning. Funding agencies began to develop and institutionalise monitoring and evaluation systems during the 1970s and 80s in response to the need to find a way to measure the effectiveness of the projects and programmes they were supporting, in order to both justify to the public their financing, and to help the project management use resources more efficiently. In theory impact assessment helps managers provide better and more convincing advice upon which to base strategic decisions about future research and development, makes scientists and researchers aware of the broader implications of their research, helps to identify weak links in the research-to-impact pathways, and assists in informing research managers on the complementarities and trade-offs between different activities within a research program (CGIAR 2000). In practice, however, impact assessment is often a process that is highly criticised both from within organisations and externally, particularly where results appear to be used for PR purposes or self-justification (Roche 1999). In such cases the portrayal of impacts usually focuses only on the positive effects of the research and frequently ignores problems (Watts in prep).

Most monitoring and evaluation methodologies are designed with projects in mind and typically utilise quantitative measures of success (CIAT 2000, Davis and Lubulwa 1995, Gryseels 2000). Established evaluation techniques have proved difficult to apply to networks without some adaptation, primarily because of the social values related to networking, the broad and long-term goals and the difficulty in drawing direct relationships between activities and impacts (Izac 1998, Karl 1998d).

Controlling impact

The degree to which research organisations are able to influence impact is generally related to the combination of the strength of the relationships created in the uptake pathway and their complexity. Consequently this means that few organisations completely control the extent of their impacts. Consequently, short-term incremental research that is common in individual projects may be able to demonstrate impact more easily than either longer-term strategic research which is directed more towards ‘systems’ or research carried out within a complex network. However overall impacts from research conducted within large networks

may be more significant, particularly if access to target groups is increased through the involvement of many partners (Lee 1992). In addition, it is important to recognise that it is not only the complexity of impact pathways *per se* that governs the expected impact but also the level of control that can realistically be expected at each stage. In this respect impact is facilitated in projects with recognised adoption pathways. Unfortunately, although many organisations have an appreciation of the importance of adoption pathways to encourage developmental change it would be optimistic to think that it is common to find ones that have a strategy for encouraging adoption at anything other than the next organisational level (Rothschild 2000, Sander 1998).

Institutional impact

Most impact assessments focus on the evaluation of the use of policy or product-based research outputs by individuals. However, given that an equally important part of developmental research is the strengthening of partners' capabilities to undertake and develop their own research initiatives it is important that impact assessment is undertaken at a unit of account greater than the research project. Donors need to recognise the value of institutional impact assessment as a component of the overall evaluation of research value.
Institutional impact assessment involves the evaluation of the performance of a research organization in structural activities such as developing research contacts through networking, training, staff strengthening and provision of information. Given the importance placed on these activities by many research organisations within a donor-based research programme it is essential to incorporate the institutional impact of research activities into evaluation programmes. Unfortunately, it is difficult to find evidence of how research structure (networks or individual projects) influences the uptake and impact of research programmes at the intuitional level. Networks and individual projects are common approaches to carrying out research within the natural resources sector yet, as CGIAR (2000) points out, there are no substantial reports that provide evidence of objective organisational impact assessment. However, it is essential that research methods and intuitional aspects of research activities do not escape impact analyses. Given that involvement in international networks is often seen as a key indicator of undertaking institutional strengthening activities it is important that this aspect of impact assessment is taken into consideration when assessing overall impact of a research activity.

Assessing research success within networks and individual projects

Spilsbury (2000) identified two types of impact: *systemic* (impacts that arise from outcomes that change the way 'systems' function) and *cumulative* (impacts that depend, for example, on the number of adopters of a particular technology). While both networks and individual projects have the potential to deliver both types of impact networks would appear to have several advantages in their ability to deliver each.

The principal difference between networks and individual projects in terms of delivering research impact is that networks bring with them the added dimension of *networking* as a distinct activity. Karl (1998a) suggests it is the benefits provided by the, often invisible aspects of networking, which many networks consider to be the most important part of their work: stimulating research, initiatives and skills; promoting and supporting new initiatives; putting people and groups in touch with each other; encouraging and generating new leadership; breaking the isolation of individual efforts. Although Bernard (1996) sounds a cautious note about focussing too much effort on indefinable aspects of networking, there is no question that new opportunities are created for impact delivery, particularly in the area of development of social capital, through the establishment of a strong family of collaborators.

Cumulative impacts are increased by the diverse and often complicated uptake pathways that frequently characterise forestry research, particularly network-based research. The multiple, often non-linear chains of events linking the researchers and their findings may

extend beyond the original target audience. This important aspect of adoption is what Bernard (1996) refers to as 'reach', and Rothschild (2000) terms 'spillover'. Reaching non-target audiences is a crucial aspect of impact assessment that is rarely measured. Complicated uptake pathways need to be incorporated into evaluation of research success in order to provide a clearer indication of the *means* by which research results are transferred and the likely catchments of research impact. Large networks inevitably increase the potential for such unregulated dissemination. However the diversity of adoption pathways can be confounded within the volatile economic and environmental conditions that characterise poverty-oriented research to such an extent that it is often inappropriate or impossible to attempt to draw general conclusions about effectiveness of either research outputs or uptake pathways (Horne pers comm.). Attempting to evaluate uptake of research within complex research networks operating in such conditions is likely to provide less certain success than simpler individual projects in which uptake pathways can be controlled more easily.

Networks by their nature increase the level of complexity of relationships with stakeholders and consequently create added problems when attempting to asses their impact. The added difficulties of measuring impact in networks is, however, generally not understood and often leads to frustration in donors and partners who want quick results and clear impacts. Networks need time to "take" (estimates vary between 5-20 years); to establish links with policy makers and to generate legitimacy within the sector. Pressures put on networks to show concrete products and progress in the short-term, and decisions to withdraw support quickly where they do not, ironically risk undermining the very capacity and impact for which they aim. As Bernard (1996) states "The foundation is set and opportunities exist, but the risk is that everything will disappear if donors back out too soon."

The difficulties of measuring impact in networks

Impact assessment can be carried out at any stage of the project from design to adoption of results. In practice, however, the value of the results from impact assessments as well as the difficulty of undertaking the assessment generally increases throughout the lifetime of the project. The challenges of evaluation are exacerbated when evaluation is attempted within the complex structure of a network rather than an individual project (Figure 4). This is particularly the case where networks are large, have been managed in a loose manner, or there is significant delay between the end of the project and the *ex ante* assessment (Henderson 1999). These difficulties should not be taken as a reason to avoid network based research but should serve to highlight the potential problems of network management and evaluation and emphasise the need to employ a range of impact indicators.

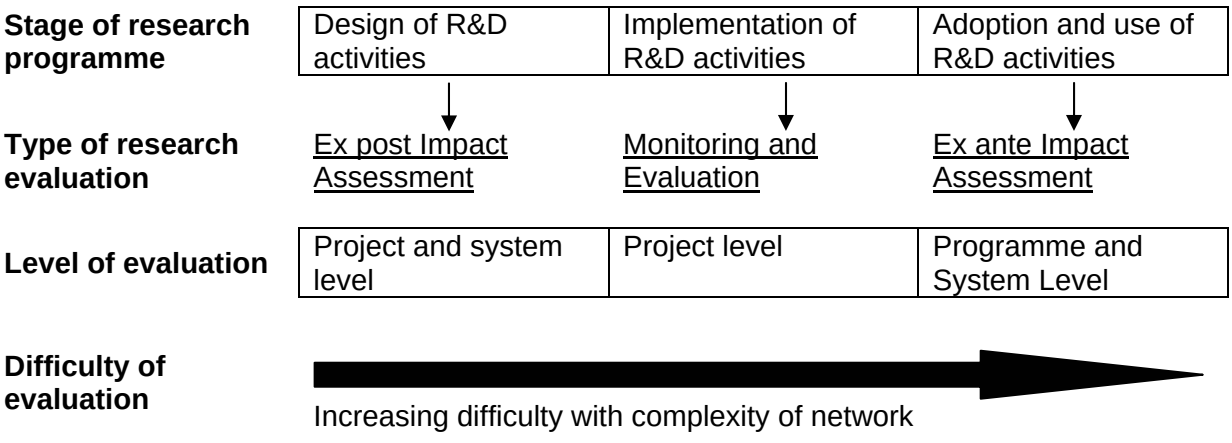


FIGURE *4 Types and uses of research evaluation by stages of research programme implementation (modified from CGIAR 2000)*

Networks and participatory evaluation

Indicators of impact need to be established by all stakeholders (Khor 1998, Pieri 1998, Purcell et al. 2001) and the process needs to be deliberately built into the research mechanism from the outset in order for it to be effective (Lawrence pers comm.). Networks are becoming increasingly less hierarchical in their decision-making structure and consequently could facilitate participatory priority setting more easily than many individual projects. However, each approach can fall foul of over-zealous and well-meaning 'experts' whose early influence can extend for years. Examples of the 'closed shop' approach to species priority setting that characterised long-term research programmes undertaken by OFI and NFTA in the 1970s and 80s undoubtedly compromised the overall value of the programmes. Fortunately, the ability of a small number of key individuals to influence research programmes that carried on for between 10 and 20 years appears to have been superseded by an acknowledgement that priority setting and project evaluation is most effective when carried out in a participatory manner (Roschetko and Powell pers comm.).

Knowledge and experience also changes stakeholder's views, enabling a broader and deeper understanding of the benefits and limitations of new technology. For example, forage scientists and government extension workers involved in FRP-funded research in Africa, India and southeast Asia were able to identify indicators of impact such as improved reproductive rates in their animals due to the increased nutritional status of animals fed with improved fodder. Farmers in the same projects may have identified similar outcomes but have been unaware of the scientific concepts underpinning improvements in fodder quality. Furthermore, farmers' measures of impact were more complex in terms of overall livelihood improvement (Pottinger 1999). The aspect of increases in financial and social capital sometimes went unnoticed by researchers due to the lack of contact with extension workers. While this lack of awareness of certain impact indicators was a reflection of limitations in the project evaluation process it was undoubtedly compounded by the complexity of relationships determined by large research networks. While it is true that multiple impact pathways can generate larger impacts they may be more difficult to manage and assess.

Incorporating complexities

The emphasis placed on research organisations and donors to demonstrate impact may lead them to focus on research that is readily quantified. This could, in turn, bias research portfolios towards individual, short-term, incremental research projects with cumulative impacts. Targeting research that addresses changes to 'systems' may have a more lasting effect but can prove less attractive to donors due to a perception of management complexities, lack of clear impact pathways, and perceived loss of control of research results. However, some approaches to impact assessment have developed effective means of incorporating the complexities of large research networks. Purcell et al. (2001) illustrate the relationship between immediate, intermediate and long-term impacts in research networks by using the example of fodder research in southeast Asia (Figure 5). In this example the evaluation criteria are diverse (economic, social and environmental) and the structure of the network determines that the broadly-based concept of 'well-being' is not only an essential component of evaluation but can only be assessed after many of the other outputs have been produced.

Monitoring and assessing the value of networks is more difficult than individual projects due to the greater range of partners involved and the added aspect of evaluating impacts of networking. A new approach of impact assessment needs to be incorporated in many programmes to measure the true value of their collaborative research activities. The current focus on quantitative indicators of success that relate to tangible outputs needs to be replaced by amore broadly-based evaluation that takes into account process-based activities such as capacity-building and the development of social capital, and refers not only to

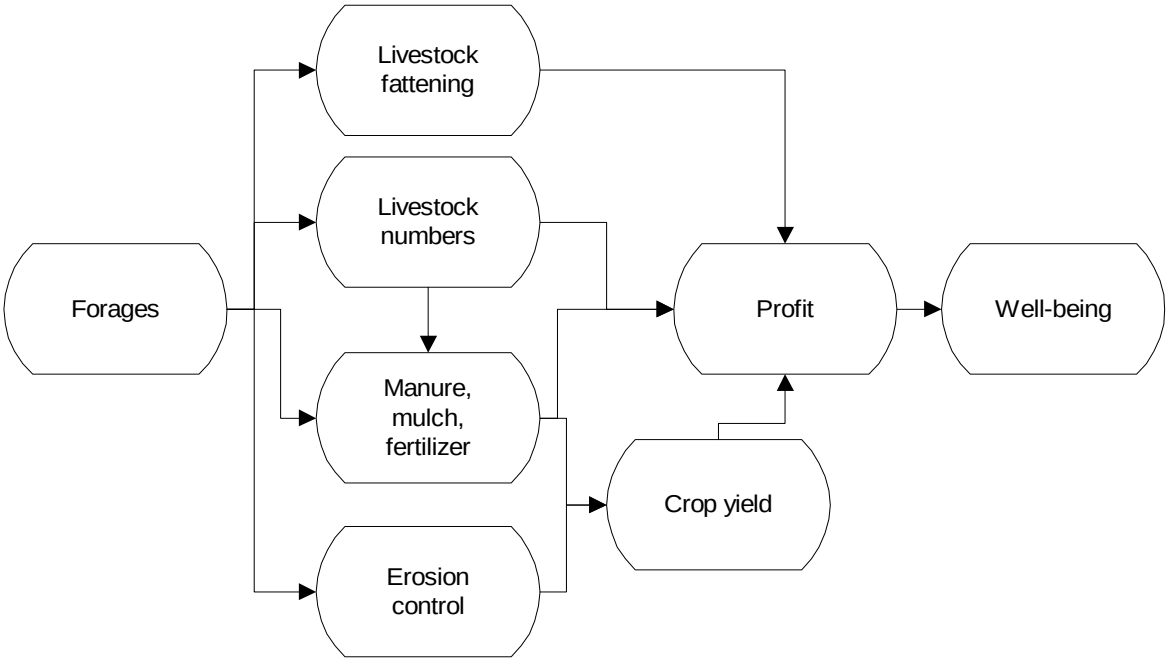


FIGURE 5 *Immediate, intermediate and long term impacts (From Purcell et al. 2001)*

immediate outputs or effects but also to any lasting or significant changes that are brought about (Khor 1998, Roche 1999). Given the length of time that it takes for many networks to produce impacts it is essential to build-in a temporal scale to impact assessment with networks.

2.4 Options for research structure

Introduction

Addressing international development is a complex process that inevitably fosters collaboration between individuals and organisations. It therefore follows that research designed to support development initiatives generally requires a range of skills and inputs. The degree of interaction in such research partnerships can vary from informal contact with a peer group to more formal arrangements for collaboration with a group of stakeholders at different organisational levels in different countries. In each case the connections that are formed create a structure that is commonly referred to as a network.

There is no strict definition of what constitutes a network. To some it may be a formal association between institutions that provides a guarantee of funding and interaction with a range of scientists towards a common purpose. To others it might be a loose alliance of individuals who have no defined output beyond supporting information flow. Some prefer to draw a distinction between centralised ‘groups’ and use the term network to describe only decentralised structures while others make distinctions on what is and isn’t a network based on the formality of obligations that exist. For many it has become an ill-defined catch-all covering any form of collaboration. But whatever the details of the structure might be there is a defining feature amongst networks of sharing resources amongst partners in order to work towards a common goal.

Donors have provided ample evidence of their interest in supporting networks to pursue scientific and developmental goals yet have done so largely within an uncritical environment. The assumption that collaboration must be good has certainly created opportunities for networks to address a wide range of research issues but the basis of the assumption has rarely been examined in any detail. Increasing calls for development programmes to highlight their impact has led to a more critical environment within which natural resources research is conducted within both the public and charitable sectors.

Despite the need for increased accountability for research activities there is still surprisingly little evidence of investigations into the effectiveness of different operational approaches to improve research efficiency. The need to collaborate is ingrained in the proposal-writing skills of all contract researchers but we have little basis upon which to decide how we should approach the issue of collaboration. The common approach of 'throwing a network at a problem' has persisted largely because complexity of interaction has often been assumed to be the best way to approach research and guarantee uptake of results. While there are many examples of successful networks there is very little published analysis within the field of natural resources development research to explain how networks operate and, perhaps more importantly, how to maximise their potential.

Why network?

Networking allows researchers access to resources in an increasingly globalised research world. As more and more research is carried out in some form of amalgamation of skills and experience it is becoming less common to see projects that do not contain an element of networking. While Stickins (2001) view of that the pooling or resources to address a common agenda can lead to more efficient and cost-effective agricultural research the assumption that 'two heads are better than one', with all its implied connotations of collaboration often undermines careful analysis of the real benefits of networks and networking. There are, of course, obvious aspects of collaboration that are often used to justify forming networks, such as sharing of resources, but the benefits, and problems, of networking can extend far beyond those normally identified within the scientific literature. Networks are becoming increasingly popular in both science and business but organisations are launching into their establishment with limited knowledge of their dynamics, effectiveness and viability (Soderbaum 2000). In fact, it could be argued that many scientific and developmental networks are underachieving due to a lack of understanding of network structure and development.

Network definitions

Karl (1998b) uses the definition of Foo (1996) that "A network is a partnership of individuals and/or organisations pursuing shared goals". This is a good working definition because it highlights the fact that although the terms 'network' and 'networking' appear to have entered the language in the past ten years they refer to a form of social relationship that has always existed. While this might appear an obvious point to make it is important because forestry research networks have frequently been guilty of overlooking the fact that networks involve people as well as organisations and that focussing on the roles of individuals may be as important, or even more important, than focussing solely on institutional relationships. Soderbaum (2000) reinforces this idea by suggesting that the network concept draws attention to the *links* and *relationships* between the nodes (e.g. the researchers), rather than to the nodes themselves. These links can create the 'social synergy' referred to by Engel (1993) (in Karl 1998c) within successful networks where individuals and institutions can interact in a cooperative manner. Regardless of how it is defined, networks work when people share information based upon a shared expertise or passion for a joint enterprise (FAO 2001).

The theory is simple; put people and institutions together and the whole will be greater than the sum of the parts. However, anyone who has worked within a network will testify that obstacles to progress appear in many guises. Progress can be thwarted by disagreements, logistical barriers, differences in objectives, but most of all effective network management is limited by our understanding of network structure, function and evolution. By gaining a greater understanding of how and why networks operate we will be in a better position to judge when to use them and when to look at alternative approaches to research management.

Networks provide a forum for communication, sharing ideas, building partnerships and alliances and working towards common goals. They are affiliations of individuals and organizations linked together in pursuit of common goals. As such networks may be called by different names such as cooperatives, consortia or coalitions but for the sake of clarity only the term network will be used in this report. Networks emerge and are organised in order to increase communication, co-operation and the use, accessing and sharing of information and knowledge, all which are essential to learning processes and mutual understanding. Networks should be understood as vehicles by which trust, communication and cooperation can be established and developed.

Although networks and networking in their most literal sense cover all types of interaction between individuals and organisations it is useful to draw some distinction between what most researchers refer to as networks and more informal collaboration. RECOFTC (2000) distinguish between formal and informal networks on the grounds of complexity and instability, with formal networks exhibiting a greater degree of focus and purpose. Soderbaum (2000) and Muscovice et al. (1997) agree that networks range in complexity from hierarchical arrangements to increasingly more decentralised and loosely-structured and informal types of unit and both suggest that formal networks commonly exhibit features such as stability and presence of official agreements. Ching et al. (1996), on the other hand, suggest that the issue of formality of arrangements is of little consequence. They consider that superficial structure does not greatly influence the most important function of networks; their ability to work across other, more formal boundaries, within organisations.

The degree of formality of association represents an important distinction between networks and organisations. Although networks rely on interaction between individuals at different levels and with different objectives they do not constitute an organisation in themselves. While networks and organisations both work to coordinate independent parts it is the lack of permanency and formal structure combined with the shared decision-making powers that distinguishes a network from becoming a formal organisation. Networks create a different type of organisational structure that recognizes diversity among its component parts and appreciates the benefits of linking up across these parts for particular purposes. A networks' primary purpose should not be to control the actions of others, but to facilitate their working together (Freedman and Reynders 1998, Imam et al. 1998). Bernard (1996) considers that networks create their own 'implementation environments' and if we are to utilise networks fully it is important to recognise that they are different from other types of organisational structure.

Forestry networks

The evolution of forestry networks over the past 30 years has shown a distinct trend from tightly controlled formal structures towards more those that accommodate more participatory approaches to decision-making and management. MacDicken et al. (1986), when referring to the most common type of forestry network in the 1970s and 80s, tree species networks, state "Networks are defined as being composed of participants who conduct a set of identical

or similar tasks for solving specific research problems". This definition highlights a view that was prevalent for many years in forestry research, and typified by ODA and IUFRO, that networks were little more than machines for producing out research results. In essence they formed a larger research organisation than any of the partners could muster but they characteristically had a management structure that was extremely hierarchical with little participation from partners except to carry out experiments. A fundamental change has occurred since that time reflecting both the growing influence of many tropical-based research institutions and the trend towards more participatory approaches to forestry research. Current networks tend to stress the issues of participation and on-going relationships and in many cases consist of complex associations aimed at generating and delivering a wide range of products and services in changing and often difficult environments. They are one of the mechanisms through which policies are implemented – both the formal development policies of donors and the more informal statements of common purpose of individuals or organisations who simply decide to come together. As innovations in their own right, networks function within their own "implementation environments" with their own goals Bernard (1996).

The benefits and problems of networking

With the increasing complexity of research issues being tackled by development agencies such as sustainable development and poverty alleviation, participation in terms of collaboration and communication becomes increasingly important (Hawtin 1991). Networks can be an effective means of providing a quick and flexible response research demands by providing an informal structure with a minimum of management (Borren 1998). Networks are, in theory, the ultimate in participatory organizations, in that their purpose is to bring together the resources, knowledge, staff, and facilities of interested stakeholders to solve problems that are too complex or large for any one individual or institution to solve on their own. Strong networks attract and hold members because they provide immediate and tangible benefits, potentially including resource and information sharing among members, minimizing duplication of efforts, and linking isolated scientists with colleagues around the world (Eyzaguirre 1996). Soderbaum (2000) suggests that networks create "dynamic research and education communities" which have proved to be crucial elements in the advancement of professionalism in research organisations that are small and weak.

A summary of the benefits and problems of networking highlighted from key informant interviews, a literature review, and comments supplied by Mike Spilsbury (pers comm.) are given in Table 2.

Karl (1998) suggests that the strength of networks lies in their exceptional ability to enhance and deepen critical thinking and creativity through dialogue and exchange, to bring people together for common causes while respecting diversity, to transcend isolation and strengthen local action; to link organising efforts and structures; to facilitate participation; to be flexible and respond quickly to new and challenging situations. Networks provide an organisational structure that gives serious recognition to the difference and diversity among its affiliated groups, yet at the same time recognises the usefulness of linking across such differences for particular purposes. Networks can, in theory at least, increase both the speed and extent of dissemination pathways but much of the potential to improve impact depends on the strength of any associated community network.

Problems with networking can often occur if there is a lack of consideration of their role in relation to existing research and development structures. The need to determine whether there are facilities and channels of communication available to encourage knowledge management and eventual adoption of results was highlighted at the RECOFTC workshop on collaborative arrangements in community forestry (RECOFTC 2000). Participants from

eleven countries in south and southeast Asia agreed that one of the principal problems they faced related to finding mean of encouraging national organisations to adopt results. They concluded that the lack of existing networking skills, and cultural and practical difficulties in making joint decisions often resulted in a stagnation of knowledge flow.

Issues with donors

Donors play a key role in the initiation and development of networks and determining their role is one of the principal challenges of network management. In a review of IDRC's long involvement with research and development networks, Bernard (1995) stated that their aim has been to foster interdisciplinary research, improve policy development, link diverse user groups, strengthen national research systems and encourage comparative analyses. Their substantial experience with networks has led them to recognise that networks are an important way to organise resources for development-related research. The level of donor influence in the early stages of network development is often determined by the existing research structure surrounding a particular issue. For example, in some situations a donor's role may be principally to bring together research partners who are already working independently on an existing issue in which case there may be little need in the way of coordination in order to operate successfully. In other cases the donor may take a more influential role in encouraging partners to work on a new subject (Beeby and Booth 1998). A strong donor influence can lead to centralisation of management activities which in some cases can be extremely successful. However Karl (1998c) reported that in the field of social development networks that were too heavily influenced by donor objectives tended to have a higher failure rate than networks that were initiated with greater emphasis on stakeholder's objectives. In addition, the positive factors of networking can be negated by problems associated with power disequilibrium, particularly between highly industrialised and less well developed partners. It is therefore essential that network management structures take account of levels of influence and power sharing.

Part of the problem with heavy donor involvement is that they can propose inappropriate associations between partners and suggest research mandates for networks that are too broad without clearly defined goals. Soderbaum (1999) gave the example donors who, for whatever reason, seek to integrate participants and researchers from the donor country with researchers in the recipient country. The North-South cooperation that is established may be an effective method of transferring knowledge and skills but may also encourage partners into collaborative arrangements that are inefficient. Greiner (1998) agreed that problems with network management can be compounded within a hierarchical donor-funded structure where participatory decision making and reviews of past decisions are not updated.

Some donors, however, recognise that networks provide an opportunity for a diverse range of individuals and organisations to have shared ownership of an 'organisation' that can provide them with resources as well as research opportunities (Sechrest et al. 1998). In these cases participation in networks can be seen an opportunity to work outside normal research channels. Lai et al. (1998) found that one of the main incentives for donors to become involved in networking is to decentralise existing structures that are not working. This is occurring on many fronts. For example, in southeast Asia increasing commitment to community based forest management associated with recognition of benefits to local stakeholders has led the way towards decentralisation of forest research (Horne pers comm.).

Donors often find networks attractive because they are an effective means of disseminating results (Saywell and Cotton 1999). But networks are not necessarily a cheap way of producing and disseminating research results. Networking is management intensive, and in

TABLE 2 *A summary of commonly-stated benefits and problems of networking*

Benefits	Problems
From the donor perspective	
1. Heightened international profile	1. Reduction of investment in national and local initiatives
2. Promotion/implementation of new approaches	2. Lack of links to national activities
3. Increased efficiency in use of resources through coordination	3. Lack of clearly defined demand for network
4. Access to resources and partners	4. Limited potential to make long-term commitments
5. Demand-led, problem-focused research possible	
6. Enhance security of experiments and data by replicating and dispersing them over several locations	
From the perspective of international research organisations	
1. Better priority identification	1. Pressure from donors to administer projects instead of NARS
2. Stability and flexibility in research activities	2. Competition between national partners
3. Possibility of decentralisation	3. Danger of undermining technical activities of NARS
4. Possibility for incorporation of related research activities and findings	
5. Capacity building through research a possibility	
6. Collaboration between NARS centres helps push progress in research	
From the perspective of regional organisations	
1. Better coordination - among researchers and institutions	1. Problems in coordination of partners
2. Improved donor contacts/negotiations	2. Competition between partners
3. Provision of common services	
4. Establishment of consultative processes through meetings	
From the National Research System perspective	
1. Sharing of information, methodologies, training with partners	1. Competition with partners
2. Attract special funding	2. Free-riding (national systems benefiting without contributing)
3. Increase national exposure for national systems and scientists	3. High costs of participation for small NARS
4. Help develop less well-off NARS	4. Decisions likely to be taken for political rather than technical reasons
5. Promote research which otherwise may not be attempted	5. Dominance of strongest member(s)
	6. Inadequate follow-up of regional initiatives at the national level
	7. Diversion of research effort from NARS research priorities
General additional points	
• Networks provide the opportunity for capacity or institutional strengthening, and thereby provide security to small or weak organisations. • Informal interaction between network members is crucial to creating added benefit from networks (i.e. spin-offs that were not predicted). It is often through interaction in networks than new relationships are established between individuals and organisations that may continue outside the network. • Networks work because researchers feel less constrained by their own organisational structures. • Networks need key personnel to run them. It is often the relationship between the coordinator and the partners that determines the level of success of the network. • Networks provide the opportunity to transfer tacit or implicit knowledge that would otherwise be 'locked' in organisations or with individuals. • Networks are most successful when they carry out work that is part of existing research agendas. Networks that suggest new ideas, however much initial support they may have received from partners, generally struggle.	

order to succeed a network must invest in full-time, highly skilled staff and in sound procedures and systems (Soderbaum 1999). In addition, the potential that networks hold for improving stakeholder inputs is not always easy to access. Watts (in prep.), in her review of IPGRI's networking activities found that in spite of the potential benefits of participation, many donors find that involving stakeholders in decision-making is a complex and difficult task.

Although donor funding is generally seen as the lifeblood of networks excessive external funding support can be detrimental to network success for several reasons. Firstly, external support can undermine the sense of self-reliance of the network and cooperation among members. Secondly, external support often dries up, leaving the network without the resources necessary to operate in cases where alternative funding sources or self support have not been established. Lastly, external support generally brings with it the donor's management objectives which may divert research effort away from valuable local activity (Soderbaum 2000, Stickins 2001).

One way to address potential problems of external funding is to ensure that members make tangible contributions in the form of membership dues, in-kind contributions, providing facilities for meetings or training, staff salary to participate in network activities, newsletter subscription fees and other mechanisms. Once a system of member contribution is established, the ownership of the network is no longer theoretical, but is based upon a real investment on the part of network members.

Network structure

There are no formal models for network structure, although attempts to categorise and name different combinations and arrangements of partners have produced names such as pyramid, fishing net, spider's web and cluster (Karl 1998c). While these aim to indicate the decision-making structure and flow of information they are in fact of more value to those writing about network structure than to research planners. While illustrative of the general nature of the relationships involved in collaborative research they fail to illustrate or categorise the complexity in relationships in either a spatial or a temporal scale. Networks are usually conglomerations of organisations and individuals that relate to each other in hierarchical and often subtle ways that are almost impossible to represent in a two-dimensional manner. In addition, they are dynamic. Their structure develops over time and with it comes changes in the partners' levels of independence and interdependence. One look at the range of network strictures produced by participants at the project workshop (Chapter 4) provides ample evidence of the potential for a number of partners to relate to, or perceive they relate to, each other within a multitude of different structures.

Although there have been few formal attempts to classify networks many researchers and policy makers fall back on the simple parameters of size and broad function. While it is tempting to use such easy means of classification they are extremely limited in their ability to increase understanding of how networks operate and their potential for addressing research issues. The simplicity such an approach with its emphasis on highly visible characteristics illustrates perfectly why researches networks remain so poorly understand. Networks represent a complex process of communication and we therefore need to move away from the traditional narrow view of pigeon-holing networks into 'information, research or development' and into a classification that is more process- rather than simply product-oriented.

Bernard's (1996) classified IDRC's networks into groups that combined their key processes with their stage of development. While her three broad classifications of *interface networks*, *projective networks* and *platforms for action* cover key stages in the evolution of information transfer are derived from networks covering a much wider range of subject areas than are addressed by this project they are nonetheless informative in terms of their process oriented approach. Interface networks are described as those still in a nascent stage, with the objective of improving relations with international agencies and donors. Projective networks

refer to those conceived with a relatively broadly-stated initial "vision" of some kind and aiming to build a case for a new research agenda by providing the opportunity for independent action on the part of an indeterminate range of interests within the research and policy community. Platforms for action are seen as groupings of networks all with a common theme who can then lobby or work together.

Although many of the networks included in the IDRC study were focussed more towards advocacy than research their process-based classification remains one of the most important indicators of the need to understand network *activities* in order to evaluate their relevance. Issues such as approaches to collaboration and the stage of development of the network highlight the need to appreciate the dynamics of decision-making and information transfer and to relate them to effectiveness of research structure.

The classification used to evaluate networks in this study uses the following three key process-oriented areas:

- ***Network management***: the decision-making processes within the network highlighting the role of a central coordinator
- ***Information flow*****:** the strength and direction of information pathways
- ***Network evolution*****:** how the network evolves over time, how that is reflected in the relationships, and whether relationships are stable or fluid at any one time.

The influence of each of these issues is discussed in terms of the initiation, management and development of networks. It is important to recognise that this classification is distinct from the traditional definitions of networks based on target audience, objective and membership. While those parameters are important in understanding the detail of specific networks they are not the key features that determine network structure.

Social interactions within a network

Allee (2001) suggests that the effectiveness with which individuals and organisations operate is determined by the following three elements of social interaction:

Domain: people organise around a domain of knowledge that gives members a sense of joint enterprise and brings them together. Members identify with the domain of knowledge and a joint undertaking that emerges from a shared understanding of their situation.
Community: People function as a community through relationships of mutual engagement that bind members together into a social entity. They interact regularly and engage in joint activities that build relationship and trust.
Practice: It builds capability in its practice by developing a shared repertoire and resources such as tools, documents, routines, vocabulary, symbols, artefacts, etc, that embody the accumulated knowledge of the community. The relationships between these levels create the foundation for future learning.

The concept of 'communities of practice' emphasises the process-based elements of networks and suggests the need to look not just at the connections between groups of individuals but also the processes involved in establishing collaboration. Examination of the learning and sharing relationships that occur within networks will assist us in applying some of the outcomes of the discussion of knowledge management dealt with in section 2.2.

The management of networks traditionally revolves around central coordination of some sort. This coordination is generally situated at the highest level of network management (for example, the donor or international research agency) regardless of the target group. Whether the main immediate beneficiaries are farmers (for example FACTNET, FTPP) field researchers (for example AFORNET, EUFORGEN), higher level scientists and policy makers (for example IUFRO) or at all levels from donor to farmers (for example the IARCs)

management structures tend to reflect a desire for simplicity and focus of influence at higher organisational levels (Séror, 1996).

Networks that are either continuation of precious work or intended to provide a forum for coordination of current activities generally have opportunities to examine domains of knowledge. Many of these networks have developed mechanisms to incorporate participatory decision-making into planning processes thereby assisting the process of 'ownership' of operations by participants. Integrating greater stakeholder participation into priority setting, general management and evaluation activities within networks is a concept that is approached by a variety of means. Some networks, such as the Forages for Smallholders Programme (FSP) that operates in southeast Asia are clearly structured in a way that not only requires strong participation by farmers and NGOs but facilitates it thought its management structure. Others may be less inclined, or less able to adopt such a high level of collaboration due to operational structures that are not served by high levels of collaboration or constraints. Watts (in prep.) describes widely different approaches to participatory inputs in network management amongst IPGRI's networks varying from highly participatory member-led structures to those managed by steering committee. However donors need to be conscious of maintaining the balance between incorporating increasing levels of participation within research networks and the establishment of local 'networks of interest' (McCarthy 2000).

Some management structures fail to fully accept and appreciate the importance of domains of knowledge as a central feature of networks. However, it would be incorrect to think that such programmes are likely to fail as soon as donor support is withdrawn. In some cases strong donor influence over a significant period of time can create research outputs that are widely used by scientists and extension workers but for which there is little real demand amongst stakeholders. Such a situation can be maintained for significant periods of time as long as domains of knowledge are ignored. An example of this is the long-term ODA/DFID support for development and utilisation of a small number of nitrogen-fixing tree species native to Central America. Species selection, scientific methodology and programme development for these long-term high-investment programmes was carried out in a highly non-participatory way. While the reasons for adopting such an approach are not relevant to this discussion it is interesting to note the outcome of these actions. A combination of significant levels of financial support from the donor, the high profile of the implementing agency and the restricted group of scientists that shared information not only meant that farmer's views were not incorporated at the initiation of the programme but, perhaps more importantly, were not adopted later. In other words the domain of existing knowledge was not examined, largely on the justification that the likely benefits of using such trees involved using explicit knowledge that was not held by farmers. The outcome was that the tree species were investigated and promoted heavily were not, in most cases, those that fulfilled the requirements of the farmers as well as alternative species. While it is important to recognise that the lack of development of a community of practice that incorporated farmer's views was the fundamental failure of the management processes, it is equally important to identify the outcome of this shortcoming. While there are cases where *Calliandra calothyrsus* and *Gliricidia sepium* are important components of agroforestry systems there is no doubt that much of their high profile promotion is the result of donor-supported initiatives which, because they can supply free trees, often become self-perpetuating. Discussion with field workers and farmers indicates that use is often determined by availability of germplasm and the degree of promotion at various levels of management creating a false sense of demand. The outcome of this approach is an outwardly successful programme in terms of outputs but one which has failed to examine livelihood limitations as expressed by key network participants.

In order to improve impact it is essential to examine ways of strengthening the overall 'practice' of sharing, interacting and creating a stronger community. Allee's (2001) model describes the outcome of a community surrounding a domain as being tools for improving its situation. While this may be the outcome of many networks it is not enough on its own as the

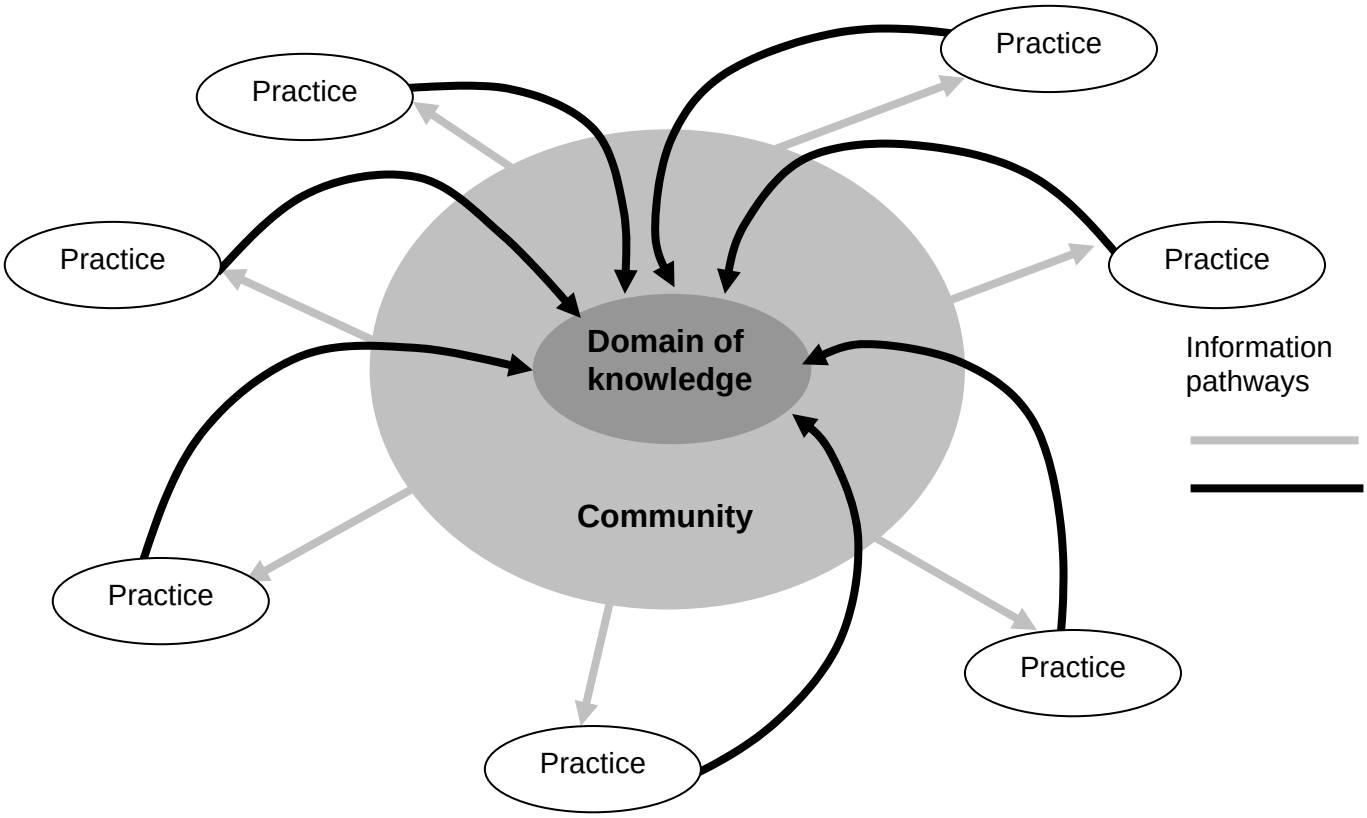
tools of 'practice' do not always facilitate the transformation of information into knowledge. Consequently Allee's model has been modified (Figure 5) to incorporate a communication loop whereby practice can be converted into knowledge. By this route practices are fed back into the domain and adapted and adopted by the community. Only then will practice become knowledge. In many cases communities of practice exist already. The challenge for network donors is first to find them. Only then can tacit knowledge be utilised.

Networks and social capital

The inappropriate and narrow parameters by which research success is frequently measured has resulted in an emphasis on quantifiable, usually economic, criteria (see Chapter 2.3). A lack of critical analysis of appropriate impact indicators coupled with a noticeable ambivalence towards project evaluation expressed by some donors has led to a view in some quarters that any evaluation is better than none at all. However, an increasing recognition of the broad and complex needs of stakeholders, as highlighted by DFID's Livelihoods Strategy (Carney 1998) has led to calls for a reassessment of approaches to impact assessment.

Although the evaluation of networks has generally taken a traditional approach of assessing financial inputs against outputs the very fact that networks operate through personal interaction means that any assessment of their success must take into account their influence on social capital. In this context social capital can be taken to be a concept that indicates a value for social relationships in terms of their ability to support and indeed improve the livelihood context for an individual or group. Haddad and Maluccio (2000) define

FIGURE 5 *Information flow within communities of practice (modified from Allee 2001)*



social capital as the number and strength of social relations that an individual or household can call on. They identify networks as being of central importance in improving human welfare through their ability to increase information flows, reduce transaction costs (due to greater trust), increase consultative decision making, and help to insure against crisis.

Woolcock (2000) identifies three types of social capital:

- **Bonding** social capital (strong ties between immediate family members, neighbours, close friends and business associates sharing similar demographic characteristics)
- **Bridging** social capital (weaker ties between people from different ethnic, geographic or occupational backgrounds but with similar economic status and political influence)
- **Linking** social capital (ties between poor people and those in influence in formal organisations such as banks, agricultural extension offices, schools, housing authorities, or the police).

Interactions within networks operate at different levels and consist of transactions of different commodities. Transfer of information, knowledge and skills all require an understanding of how individuals and organisations communicate with each other, particularly at different operational levels. The marginalisation of poor people within research networks is largely based on poor linkages with other groups. Woolcock identified that a typical problem for poor people is that while they might have plenty of bonding social capital and even some bridging social capital (scattered friends and acquaintances and distant relatives in other areas) they generally have no linking social capital or "friends in high places". Knowledge transfers both within and between network levels should seek to strengthen individuals' linking social capital in their attempts to address improvements to livelihoods.

Bonding social capital is also particularly important to focus upon for networks as it provides a social framework whereby new ideas can be introduced, discussed and developed such that improvements to productivity can be shared. Improving bonding social capital is therefore important if we are to see an uptake of results and thereby an impact. Strengthening bridging social can also be seen as a desirable development of bonding social capital and could provide the potential for dissemination of results.

Haddad and Maluccio (2000) found that although the manner in which social capital pathways operate remain unclear it was evident that high social capital indices are positively associated with household welfare. Although they dealt with the issues of savings and religion with regard to impoverished groups they concluded that it was necessary to remove hierarchical structures, improve communication and improve networking at a local level in order to build trust within a community.

Networks are perfectly placed to build trust and improve community relationships because of their ability to operate at a level that promotes decentralised and horizontally-structured communication. For example, Barr (2000) found that in Ghana small-scale entrepreneurs with poor access to formal credit, insurance and the courts, network in a way that helps them enforce informal trade, credit and insurance arrangements. They maintain smaller, more cohesive networks that enhance their bonding social capital by building trust. These networks do not yield high returns in terms of productivity, competitiveness and success, but do provide groups of small-scale entrepreneurs with a shared basis for reducing the risks that they face. Such an environment encourages the transfer of tacit and explicit knowledge and therefore has the potential to strengthen impact pathways. If the full value of the networking process is to be appreciated it is essential that evaluation processes need to take account of value of social and mechanisms for knowledge transfer at both the planning and execution stage.

The emergence of networks in business

The most striking feature of reviewing the literature on networks in forestry, and science in natural resources research in general, is the lack of information or analysis of network structure and function. Networks are seen as tools or organisational arrangements that are there to be used but there is virtually no attempt to understand how networks operate. A central belief of this study is that without such knowledge it is not possible to improve

significantly upon the management of collaborative research. It is perhaps a reflection on developmental science in general, and certainly literature related to research in development, that there is less analysis of operational methods than in the business world. Perhaps it is not surprising that an arena that revolves around economic competition is likely to generate greater analysis of operational approaches than the less competitive world of developmental science. But given the prevalence of networking as method of pursuing science and development, the absence of analysis of network operation needs to be addressed.

Scientific and business networks have many issues in common and there is much that can be learned from networks that operate in a competitive financial market. In particular issues of knowledge management, organisational structure and network evolution have been addressed in business literature while there is little reference to them in literature relating to science in development. However, while there are similarities between business and scientific networks there are also differences. Competition, although present in some areas of scientific research, is not in general the principal driving force in science, and certainly not in development which is characterised by a willingness to share information. One of the outcomes of this is that commercial networks are often characterised by a more rigid vertical structure within which information flow is restricted. The benefits of a more horizontal nature of development networks, where there is the theoretical opportunity for information to be produced and shared at different levels, is only recently becoming accepted in business literature (for example Chisholm 1998, Dixon 2001, Greiner 1998). In order to remain competitive and adaptive to global markets more and more organisations are adopting a new organisational form, referred to by Ching et al. (1996) as *network organisation*. This has been driven by a need to achieve greater structural effectiveness and responsiveness. They report that a network organisation is formed when separate firms get together to form a larger organisation.

Although there is a basic difference between the world of development and that of business in that the latter is dealing with the promotion and sale of a product in a product-competitive environment, there are important lessons to be learned from business for several reasons. Firstly, a competitive environment often drives innovation and streamlining for success due to the pressures caused by constant monitoring for success. This provides the potential to study business ideas and models for efficiency. In development it is often so much harder to evaluate success that this element is missed-out altogether. The second is that, according to Beeby and Booth (2000), there is a change in the manner in which business organisations see themselves. In recent years, the attention of many strategic management scholars has moved away from an explanation of competitive success based in creating and sustaining successful market positions, towards a view of strategic success based on the resources and capabilities of the organisations – the so-called 'resource-based' view of the firm. Of these resources, the ability to acquire and integrate knowledge (in other words, to learn) has increasingly been accepted as the most important and valuable.

Networks in international scientific support for development have generally been established against a backdrop of social needs. The often ill-defined value of many research outputs and the associated inability to measure impact have contributed to a lack of clarity of purpose in many forestry networks. That is not to say that they do not have a defined purpose but that purpose has not necessarily been assessed fully through the process of impact assessment. This situation is perhaps understandable given the lack of financial incentive associated with most research success in this area. One consequence of this situation is that certain aspects of network function remain unacknowledged in developmental science literature. The most obvious of these is the role that networks play in achieving major targets outside the objectives of the network itself.

Current thinking in business literature suggests that networks have a key role to play in recognising future demands and generating ideas to cope with them. In this respect one of the main reasons that networks are becoming increasingly common in business is the perception of their ability to produce spin-off effects through innovation. Swann et al. (1999)

describe the process of interaction of diverse groups of individuals providing more than just a solution to the original issues addressed by the network as 'boundary spanning activities'. This generation of new ideas and solution to problems in relation to the demands facing the organisation has been shown to be increased within more heterogeneous groups leading Bhadbury et al. (1996) to suggest maximising diversity amongst work teams. Debackere et al. (1996) reviewed models designed to estimate the value of networks to business organisations but found the few existing models limited in scope. However, they concluded that towards the basic end of the R&D spectrum collaboration through networks enhances the innovative productivity of the firm.

The recognition of the innovative potential of networks and how this can be used in forestry research requires careful analysis. While innovation may not at first appear to be a major objective of donor agencies involved in natural resources research it is worth asking the question 'How many donors actively encourage generation of new ideas from networks?' The project-based approach that characterises much of forestry research does not tend to provide the flexibility required to capitalise on new ideas produced within networks, and it is questionable whether in most cases there is even the mechanism to incorporate them. Research demands in international development and approaches to meeting them are too frequently determined by a small group of individuals who are not impacted directly by their results. Opportunities for stakeholders within research networks to influence future research plans are usually minimal or compromised by lack of means for their expression. In comparison, the more product-oriented and competitive environment of private enterprise increasingly fosters innovation in the hope that it will lead to organisational success.

Although business literature has much to tell scientists about network management it is important to be careful in drawing conclusions. One of the main concerns that business networks need to guard against is the diffusion of a firms' knowledge assets that would reduce their competitiveness. This is contrary to most international development agencies for which information diffusion is a priority. However Beeby and Booth (2000) point out an important pitfall that networks in business share with science, that alliances may lead to 'dependency relationships' where partners lose their ability to operate successfully without outside support.

While Bernard (1996) may be right in her assertion that networks are prime vehicles for programme delivery in times of decreasing development assistance resources because they have the potential to improve coordination, enhance information exchange, support human resources development, and decentralise management, it is important to recognise that there is potential to improve their management and increase their effectiveness. While business literature reflects the tremendous potential for networks to increase organisational flexibility Karl (1998) highlights the need for those interested in promoting development and social change to give greater attention to how they operate.

Finding the most effective network structure

Networks are employed by a wide range of organisations to achieve their objectives. Many of the most prominent are donor supported and international in nature. But in attempting to assess whether there is a relationship between network success and organisational characteristics it is important not to confound superficial issues with those associated with effectiveness. While certain organisations may favour networking as a method of pursuing their goals, and may even have it adopted as part of their objectives, it is rarely the case that this is a reflection of an assessment of options for effectiveness. For example, the prevalence of networking activities undertaken by regional research organisations compared with national institutions reported by Soderbaum (2000) and Stickins (2001) is to be expected. Regional organisations are generally mandated to look at collaborative approaches to research as a central part of their objectives but while they may have the capability to undertake network-based research more effectively than smaller, more locally-based, organisations it does not necessarily mean that networks are effective or even

required. The different strengths of regional research organisations, sub-regional research organisations, national agricultural research organisations and international agricultural research centres in terms of local, national and international influence, political support, ability to secure funds and overall research effectiveness cannot be characterised accurately by assessing their superficial structure. Donor support is frequently focussed on particular network levels, for example in strengthening sub-regional agricultural research organisations (Stickins 2001), but there is little evidence to suggest this is undertaken following a thorough assessment of options. Opinions of politicians and donors to support networks at a particular level are generally based on existing structures and opportunities rather than a detailed consideration of options.

Soderbaum's (2000) review of regional research networks in Africa identified a hierarchy in terms of management and complexity ranging from regional research organisations, through regional research associations to regional research associations and projects. While he suggested that the further one moved away from regional research organisations the more the research structure resembled a network he was unable to identify which system was most effective in either carrying out research or supporting uptake of the results.

In Barr's (2000) assessment of network size for small-scale entrepreneurs in Ghana she considered whether the traders should be encouraged to build larger, more diverse, far-reaching networks to reap greater returns, whether backing small, cohesive networks is more beneficial to those entrepreneurs, or whether entrepreneurs should be left to maintain the networks their view as the best, given their circumstances. She found that it was not the size of the network *per se* that was most important to the traders but the environment in which they operate. If they concentrated on bigger networks there was a concern that they might find themselves out of their depth. This is a situation that faces many smaller networks when considering their future, particularly in relation to associations with donors. Barr concluded that care must be taken to analyse strengths and weaknesses before changing network design and there should not be an instant conclusion that bigger is better.

Discussion

Networks and individual projects cannot always be distinguished in a meaningful manner. At their extremes each can be characterised by superficial elements; networks by their interactivity and decentralised structure and individual projects by their centralised simple structure and narrow focus. A simplified comparison between the two approaches to research could consider the basic features of function, organisation and goals, as follows:

- **Function:** A typical feature of networks is that they are multifunctional and have a number of different aims and activities that they strive to achieve simultaneously.

- **Organisation:** One of the key differences between networks and individual projects is that the former is a much looser arrangement of associations. One of the reasons for this is that the relationships in a network are often of a non-formal nature, whereas in individual projects there is often a greater degree of formal commitment between the coordinators and the partners.

- **Goals:** The targets of networks are frequently less clear than for individual projects.

However, almost all research except that which has only the most local impact is carried out to some extent in a collaborative manner and with no agreed definition of either there is an inevitable reference to archetypal structures of each when making comparisons. Furthermore, the degree of variation within organisational structure of each means that when looking at what networks can provide in terms of research impact when compared to individual projects it is generally difficult to draw conclusions. This variation encompasses examples of research structure that can apply to both networks and individual project to such an extent that it is difficult to say that there are profound differences between them in terms

of what they can achieve. In this regard, if comparisons are to be made it is perhaps most useful to consider what each can do better than the other.

Networks not only foster participation by a wider group than traditionally reached through individual project (Sim 1998) they can also operate in a totally different environment from individual projects in that they often lie outside main organisational research agendas, funded from outside sources and thereby create an environment where, as Bernard (1996) puts it there is "a greater margin for experimentation and risk-taking". Therefore, when considering a choice between networks and individual projects it is worth pointing out that networks can do things that individual projects cannot achieve; namely to break away from the formal towards a more informal and community approach.

Chisholm (1998) describes networks and networking as "a social enterprise, not simply a linking of discrete units". While the many benefits of social interaction provided by networks are referred to throughout the report one of the main differences between them and individual projects lies in their ability to improve collective responsibility. The need, and responsibility, to work towards s common goal is not only an important element of strengthening social capital amongst end users but enables scientists reduce dilution of efforts by focusing on their areas of expertise.

As described in section 2.2, networks can also create opportunities for knowledge transfer by providing new channels of information and lifting barriers to communication. Through this they provide more opportunities than individual projects to increase both human capital (in terms of knowledge) and social capital (in terms of strengthening relationships with useful partners). These benefits can be increased if there are opportunities to utilise the potential for innovation that networks create

2.5 Network evolution

Limitations to current understanding of network development

Networks are, by their very nature, difficult to define and the literature on analysing network structure in forestry research is severely limited. Soderbaum's (2000) definition of networks as "an informal, voluntarily based, dynamic and borderless open system which is flexible, fluid, adaptable and susceptible to innovations, new ideas and needs without that its internal balance is threatened" highlights the dynamic nature of a management system that is both complex and changeable. Understanding the changes that occur throughout the life of a network is essential if we are to identify whether or not a network is operating successfully, yet it is difficult to find information that deal with issues of organisational structure and development in research networks. The literature tends to report network success rather than analyse how networks operate.

The situation is quite different when talking to network managers. In general they are extremely aware of the unique social aspects of networking and the changes that occur throughout a network's life. Unfortunately, natural resources research tends to shy away from an appreciation of the importance of personal relationships and as a consequence there is a significant gulf between network managers' understanding of network dynamics and the information that is available to policy makers when deciding on the relevance of networking as a research tool.

One of the problems with evaluation of network success is that network managers are generally judged on quantitative aspects of network functions and rarely evaluated on the process of networking itself. Yet discussions with network managers underlines the importance of understanding of the strengths, weaknesses and processes involved in networking. If we are to take networks forward and maximise their capacity to produce the

results that we want then it is important to understand better the processes involved in network development. Our limited knowledge of these processes at present is a severe limitation to future progress in developing the use of networks as research tools.

Network evolution

A commonly-held view amongst donors is that networks are born through donor support, they live for a while though the combined efforts of donors and partners and then they usually die once the period of donor support finishes. Although most networks have a degree of capacity building incorporated in their plans with a view towards supporting sustainability it is frequently the limited life-span of networks in the post-donor stage that has led to questioning of the networking approach. Given the frequency with which networks are adopted as a tool by developmental researchers to deliver their impacts it is surprising that there has been so little analysis of the developmental changes that occur within research networks. This is in stark contrast to the business community where organisational development is accepted as a major area of research and seen as being fundamental to the successful progress of many companies. Although Bernard (1995) concedes that successful networks need to accept 'adaptive evolution' it is perhaps an indication of the differences between developmental science and business in terms of competitive pressure that there remains a lack of understanding of network evolution in research networks.

It is widely accepted within business management literature that organisations pass through different phases of development, and that an understanding of each phase is a key to overall organisational success. Greiner's (1998) benchmark analysis of organisational evolution highlights the fact that development within an organisational structure can be broken down into clearly defined phases. Each phase begins with a period of evolution with steady growth and stability and ends with a revolutionary period of substantial organisational turmoil and change. The manner in which change is managed is the key to whether an organisation moves forward.

Greiner considers there to be five *key dimensions* to an organisations' structure that must be considered when attempting to understand the pattern of its development. These are described below:

1. *Age* The same organisational practices are not maintained throughout a long lifespan therefore it is important to be ready to review and change.
2. *Size* The problems of managing an organisation tend to increase with the size. These include:
   - Coordination
   - Communication
   - New functions
   - Levels in management hierarchy
3. *Stage of evolution* Once an organisation has overcome a period of instability, if it survives it usually embarks upon a period of evolutionary growth where things are stable for some time. Evolution at a calm level is not something that can proceed for ever.
4. *Stage of revolution* This is important in terms of recognising limitations to current practices (sometimes due to failures but also due to simply a change in size of the organisation, or the market structure). If organisations cannot change then they either fail of stop growing
5. *Growth rate of its industry* The speed of encountering periods of evolution and revolution is related to the type of industry and its rate of growth.

While Greiner's view of the continual struggle between evolution and revolution in a network might sound overly dramatic to biological researchers there are nonetheless many valuable points in his model. The concept that organisational practices change throughout a network's life is not generally discussed in natural resources development literature yet is fundamental to the manner in which networks either develop or fail. While most network

plans acknowledge that changes occur during the life of a network they tend to refer to output-related rather than process-related management practices. Greiner's model addresses the idea that management skills and practical requirements change as the network itself changes. Equally important is his recognition of key points where the direction of networks can change. In the case of many forestry research networks their ability to continue in certain directions can be attributable to inappropriate monitoring and evaluation procedures fail to pick up the shortcomings in the operation of the network.

Phases of growth of a network
Greiner outlines five key phases of organisational development. These have been adapted for relevance to research networks:

Phase 1: Creative [pre-network establishment phase]
- The instigators are often senior scientists and not normally involved in management activities
- Communication is frequent and informal

Developmental issues
As the network develops management becomes more important and the need for formalised communication becomes apparent.

Phase 2: **Direction [network establishment phase]**
- Management structure is identified
- Clear roles for collaborators are identified
- Communication becomes more formal

Developmental issues
Participatory structures required to meet collaborators needs.

Phase 3: Decentralisation
- More responsibility is given to regional coordinators
- Contact from the top is infrequent and happens in a more formal manner (e.g. workshops)

Developmental issues
Divisions between regional coordinators and senior management leading to one of two outcomes: either the collapse of the network or a reassessment of its framework. Greiner refers to this stage as a 'crisis of control'.

Phase 4: Coordination
- Characterised by using formal systems of management.
- Decentralised units are merged into formal groups.
- Certain technical functions such as data processing are centralised.

Developmental issues
This approach leads to resentment from field workers.

Phase 5: Collaboration
In response to the dissatisfaction of collaborators in the previous phase the next phase emphasises strong interpersonal collaboration.
- A more participatory structure is developed emphasising teamwork.

Greiner suggests that this is where consultants may be brought in.

Phase 6: Creation of a new network
What Greiner refers to as a 'network of companies' can be considered as a new organisational structure that is no longer dependent upon the previous management structure.

While the latter stages of this model do not necessarily fit closely with natural resources research networks, it is in most cases due to either the long life cycle of the networks that is

determined by the nature of the material (for example the time between planting and assessing trees) or the collapse of the network at the third phase.

A key distinction between organisational changes in research networks and business networks outlined by Greiner is in the stimulus for change between developmental phases. While business networks tend to oscillate between periods of evolution and revolution the less combustible operating environments encountered by scientific networks tends to make the change between developmental stages a more gentle process.

Bernard (1996) agrees with the concept of adaptive evolution in networks. She considers that the evolutionary process with its greater degree of informality can create capacity for longer-term influence, more efficient use of resources but less more predictable activity. However, she points out that such evolutionary stages tend to move networks away from those features of flexibility and informality which define them as networks. But she again agrees with Greiner's sixth stage, that ultimately they can also form new networks as a way to maintain specific goals. The challenge for donors is to accept that networks are dynamic and to determine what degree of movement away from initial goals is acceptable.

Karl (1998c) is also in agreement with Greiner in terms of recognising that networks generally develop from small independent informal groups into larger more formal organisations that can often struggle with the new management structures. She reported that the main reasons for becoming more formal are to ensure participatory structures and accountability. Balasubraminiam and Fernandez (1998) also report that single issue networks may dissolve once the initial challenge has been overcome or when the issue is taken up by a wider group.

In her review of IPGRI's networks Watts (in prep.) emphasized how decision-making also changes as the organization evolves through time. In the early stages, the organization is an informal grouping of people brought together by technical interest and entrepreneurship. Later, the organization goes through phases of centralization and decentralization, and structures and control develop and change. However, Marschan et al (1996) found that it is not always easy to move towards greater decentralisation in a network due to the 'administrative heritage' of the organizations involved.

Changing organizational structures or developing new ones is a key part of network management but it is essential that changes to network structure do not act as a barrier to communication. Such changes can be incorporated but careful network management requires experience on the part of managers and flexibility by donors.

An alternative view of network development

Allee (2001) provides an alternative model for network development to that suggested by Greiner. The stages are similar to Greiner but, importantly, they define an end point at which partners disperse. The key points of the model indicated by Allee are described in Table 3 and modified to relate more to development issues.

One of the key points in Allee's model concerns the end of the networks, or the *dispersing* stage. The issue of whether networks have a logical end point or continue their development and evolution is debatable (and was one of the most frequently discussed issues at the project workshop Chapter 4). Some consider that a network once it has served its purpose should finish while other argue that there is a splintering of issues toward the projected end of the work which in turn stimulate new initiatives.

TABLE 3 *A description of network development (modified from Allee 2001)*

Stage	***Opportunities for OD support***
1 **Potential**_At this stage there is a loose network of people with similar issues and needs. People need to find each other, discover common ground and prepare for a community.	Carrying out stakeholder analysis (participatory?)
	Diagnosing organisational issues around communities
	Development of a networking strategy
	Helping people find common ground through interviews and group dialogue
	Identifying what knowledge a community wants/needs to share
	Identifying and training potential key figures in the network
	Facilitating dialogue around identity and joint enterprise
2 **Coalescing** At this stage people come together and launch a community. People find value in engaging in learning activities and design a community.	Designing, facilitating and documenting informal meetings
	Mapping knowledge flows and knowledge relationships
	Designing and creating a community support structure
	Coaching community coordinators, communicators and support staff
	Building organizational support
3 **Maturing** The community takes charge of its practices and grows. Members set standards, define learning agendas, and deal with growth. By now they are engaging in joint activities, creating artefacts, and developing commitments and relationships.	Guiding a community through growth
	Co-developing support strategies for the group learning agenda
	Creating frameworks, guidelines, measures and checks for development
	Designing knowledge capture and documentation systems
	Designing, convening and facilitating conferences
	Working with the community on issues around relationships
	Building a coordinator community and sharing best practices on community building
4 **Active** The community is established and goes through cycles of activities. They need ways to sustain energy, renew interest, educate novices, find a voice and gain influence.	Working with the community on issues around commitment and sustaining energy
	Addressing organisational issues that may be helping or hindering activity
	Linking community learning to individual career development goals
	Helping negotiate the role of the community on organisational decision-making
	Forge links with other groups and communities for mutual learning.
5 **Dispersing** The community has outlived its usefulness and people move on. The challenges are about letting go, defining a legacy and keeping in touch.	Helping people let go
	Preserving artefacts, memorabilia and maintaining history
	Convening reunions
	Maintaining maps and directories

2.6 Development of framework for case study assessment

The preceding sections have outlined the different approaches taken by research organisations to promote research activities, support pathways for dissemination of results and encourage and evaluate impact. There is, however, a paucity of information available to assist research managers in making comparisons between different approaches. What is needed is a means by which a research issue can be analysed to determine the best approach to addressing it while aligning it to operational methods within the overall research strategy.

In order to address this shortcoming a case study analysis was undertaken (Chapter 3) both to evaluate and understand better the different approaches undertaken by individuals, organisations and networks carrying out research, and to investigate whether researchable issues should be dealt with by networking or individual project. In order to carry out the assessment it was necessary to produce a 'survey instrument' that could be used in the evaluation of the case studies addressed in Chapter 3. The framework for case study assessment was consequently divided into the following three parts, each of which is discussed below:

- *Determination of research structure*
- *Evaluation of research structure*
- *Investigation of the developmental stage of the project*

Determination of research structure

In some cases choosing between networks and individual projects as a means of addressing a researchable issue is determined by a combination of the characteristics of the project itself and the objectives of the donor or coordinating organisation. The relationship between these two factors is determined largely by the degree of analysis and understanding of the issue and the management structure imposed by the donor. The parameters of a project that indicate whether it should be addressed by a network or an individual project have already been discussed and fall into the categories of experimental structure, resources availability, knowledge management system, and the targets of the donor in terms promotion and capacity building.

If networking is taken to mean carrying out research within a multi-organisational collaborative structure then it is commonly assumed that any issue that benefits from multiple partners should be addressed by networking. However, although issues that require networking might appear obvious it is important to analyse their underlying assumptions, the most important of which is whether or not there are shared or common objectives amongst the partners. The essence of networking is partnership and the concept that the whole is greater than the sum of the parts. However, some partners may join collaborative research initiatives for reasons that relate to their own short-term goals than the overall objectives of the network. In such cases the strategic goals of partners, particularly of individuals within organisations, can lead to lack of commitment and involvement in networking activities thereby compromising the success of the network. It is therefore essential to examine the overall collaborative structure within with the research will be undertaken before making a decision on how to proceed.

Section 2.4 highlights that networks are frequently seen by donors and coordinating agencies as an effective means of achieving their strategic objectives. From a donor perspective there may be a desire to support a particular agency for reasons that are political, strategic or because networks are accepted as an effective means of addressing their scientific or developmental aims. In this regard it is important to assess the means of information exchange that appear to be effective in the region in which the work is to take place. For

example, in some areas there may be evidence to suggest that regional research networks are already effective in supporting development initiatives due to a particular combination of institutional strengths, targeting of donor support, and established information pathways (Soderbaum 1999, Stickins 2001). The existence of successful networks, whether they are at a local, regional or international level should provide valuable evidence of current means of information transfer and therefore assist in making decisions about supporting research initiatives.

Practical limitations to carrying out research are often the most important factor determining whether or not to pursue a networking approach to research as lack of resources whether they are financial or scientific frequently determine the need to collaborate with partners in pursuit of shared aims. In this regard it is important to identify whether or not there are existing incentives at either an administrative or financial level to support scientific research through networks or individual projects.

Evaluation of research structure

The fundamental difficulty in evaluating processes in networks is drawing the connections between actions and achievements. In networking, achievements are usually the result of the combined efforts of many people and organisations but this complexity makes it difficult to draw a direct comparison between any one action and achievement of a goal. Unfortunately, current approaches to research evaluation provide little scope for addressing these complexities. Section 2.3 indicated that while evaluation of research is most successful when it considers a range of indicators of success current approaches to research evaluation tends to be too heavily biased towards a limited number of product rather than process indicators. However, there is no agreed model by which impact can be assessed within natural resources research in rural development. Sechrest et al. (1998) argue that none of the many formal models for adoption captures the complexity of the adoption process from scientist to farmer. They claim that the formal models seem particularly limited from a pragmatic standpoint and do not take account of the adoption-maintenance process, which is multi-faceted, longitudinal and population based. Karl (1998d) also recognised the limitations to existing methods of monitoring and evaluation in networks and the need to develop new ones in concluding that the biggest challenge facing networks in terms of assessment of success is developing methodologies that take into account the political nature of networking, the qualitative aspects of achievements and the impact on people's lives and society; and that take into consideration gender issues.

The lack of appropriateness of simple evaluation models has been highlighted in the past few years by the acknowledgement in some quarters that addressing poverty through research requires recognition of a range of 'assets' (Carney 1998). The complexity of the relationship between the different types of asset and access to them is now recognised as a key element in the definition of poverty (Arnold 2001). This can be seen either as insufficient assets (natural, physical, financial, human or social) or an inappropriate mix of them in order to create a sustainable means of living. While the potential influence of networks and individual projects on human and social capital has been addressed in section 2.4 there is no clear or agreed means by which to incorporate them into an evaluation of research success.

The limitations of simple, economic-focussed, evaluation models have been accepted in business for some time and have led to the development of a range of more complex analyses of success. Examples of the most relevant broad based approaches to evaluation used in business are described briefly below.

- **Balanced scorecard**: a strategic, measurement based management system, originated by Robert Kaplan and David Norton, that provides a method of aligning business activities to the strategy, and monitoring performance of strategic goals over time. It provides visibility on the evolution of the business goals and the performance of the business strategy. The balanced scorecard translates an organisation's

mission and strategy into a management system. The scorecard measures organisational performance across four balanced perspectives: financial, customers, internal business processes and learning and growth. It supplements traditional financial measures with three additional perspectives – customers, internal business processes, and learning growth. This approach is designed to balance all major critical areas of an organisation and is considered to be an important alternative to traditional means of business performance evaluation.

- **Triple bottom line**: focuses corporations not just on the economic value they add but also on their environmental and social value. At its narrowest, the term triple bottom line is used as a framework for measuring and reporting corporate performance against economic, social and environmental parameters. At its broadest the term is used to capture the whole set of values, issues and processes that companies must address in order to minimize any harm resulting from their activities and to create economic, social and environmental value. This involves being clear about the company's purpose and taking into consideration the needs of all the company's stakeholders. Triple bottom line evaluation scores performance in terms of society, economy and environment that interact and create 'shear zones' where critical activity takes place.
- **Relative value**: was developed by Bob Buckman and Leif Edvinsson to assess progress rather than simply a quantitative target as the ultimate goal. While this uses quantitative measures its focus is on the comparison with past performance and measuring the improvement.
- **Network worth**: is a concept developed from 'business worth' in which an assessment is made of the value of the network based on looking at things from the perspective of key questions, for example 'What would happen if the network was not present? What would happen if it doubled in size?'

Each of these models illustrates the acceptance of complexity and change within interactive organisational structures. They also accept that financial parameters are only one of a number of criteria that make-up overall success. The breadth of evaluation criteria both in terms of products and processes is in stark contrast to the options employed by most evaluations of natural resources development research and suggests a possibility for adaptation of existing approaches to evaluation[8].

Knowledge management and knowledge transaction

One approach to evaluation of research structure is to look at the effectiveness of knowledge transfer mechanisms within networks and individual projects. By examining the manner in which explicit and tacit knowledge are transferred through the mechanisms identified by Beeby and Booth (2000) of socialization, externalisation, combination and internalization it may be possible to identify which structure is more effective in assisting uptake of results.

If we are to improve knowledge transfer within networks it is essential that we understand better the types of knowledge concerned and the mechanisms of transfer. Comparing networks and individual projects in terms of their ability to pick up, use and disseminate knowledge at different levels may provide an indication of their applicability to particular situations. Furthermore, analysing linkages in terms of knowledge transfer that exist between different levels within a network may provide an indication of priorities for action in order to strengthen the overall knowledge management strategy of the research structure. Figure 6 illustrates the strength of knowledge transfer linkages between organisational levels within a hypothetical forestry network.

[8] A notable exception is Henderson (1999) in which the author employed a modified version of the balanced scorecard for evaluation of forestry development projects.

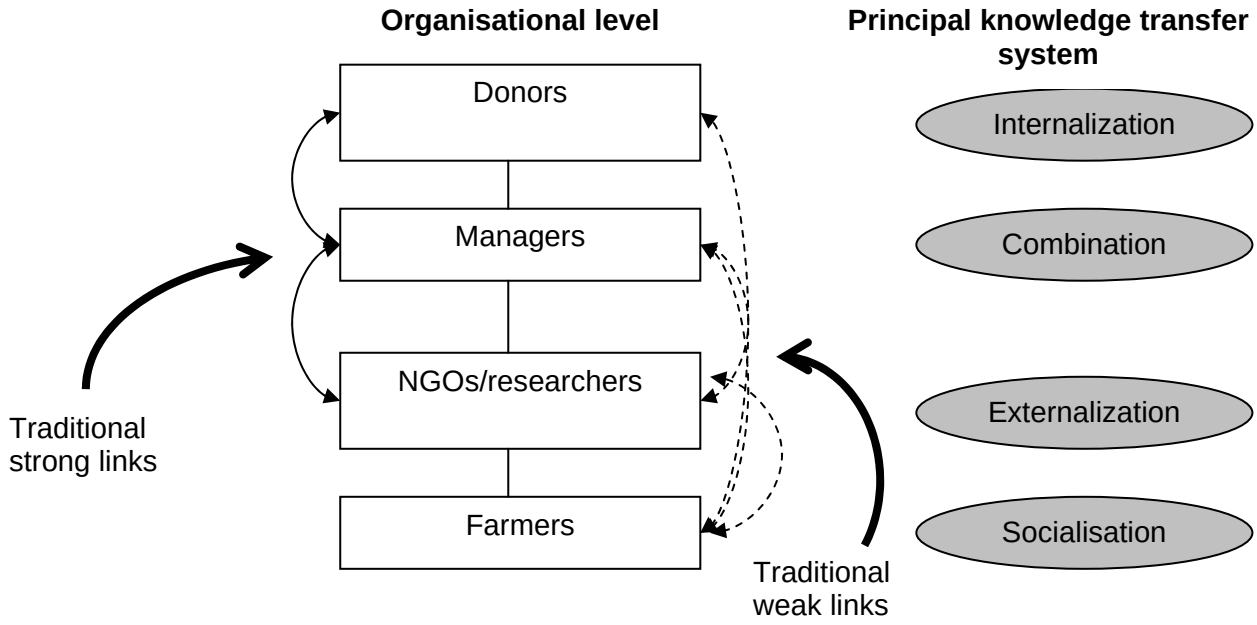


FIGURE 6 *The strength of knowledge transfer linkages between organisational levels within a hypothetical forestry research network*

Investigation of the developmental stage of the project

Section 2.4 discussed the value of Greiner's (1998) concept of developmental stages within an overall framework of forestry research network evaluation. The discussion revealed the principals and relevance of a model that describes how a network develops over time by considering the phases of growth, change and conflict that arise. Although the developmental stages suggested by Allee's (2001) structural analysis of knowledge networks and communities of practice were developed independently of Greiner's study it is interesting to note their level of congruence. Both see networks as highly dynamic and often volatile but each notes clearly defined phases though which the network travels. However, indications from the business sector that networks have a clearly defined pathway along which they travel and it is only through an understanding of the issues surrounding the different developmental phases that effective progress can be made are not immediately transferable to scientific research. Greiner's work resulted from years of studying organisations in business and therefore has limitations when considered within a scientific context where there is a different approach to the degree of central coordination of networked activities. Watts (2000) hypothesised that networks gradually become more decentralised through time and with development of their own management structures and subsequently considered that Greiner's model had more relevance to her study of IPGRI's networks when set within the context of the level of centralisation of the network.

The concept of using a model to illustrate network development for this study was adopted in response to the perception of a widespread lack of clarity amongst donors and network coordinators relating to how their network could and should develop. It was felt that a graphical representation of network development that could be used in conjunction with analyses of knowledge pathways would provide a tool that could be used to identify strengths and weakness in assessing collaborative research. Key points from the models developed by Greiner and Allee, and modifications suggested by Watts (pers comm.) were used to construct a model illustrating key managements skills, practical requirements and developmental phases of network evolution for use in the case study analysis (Figure 7).

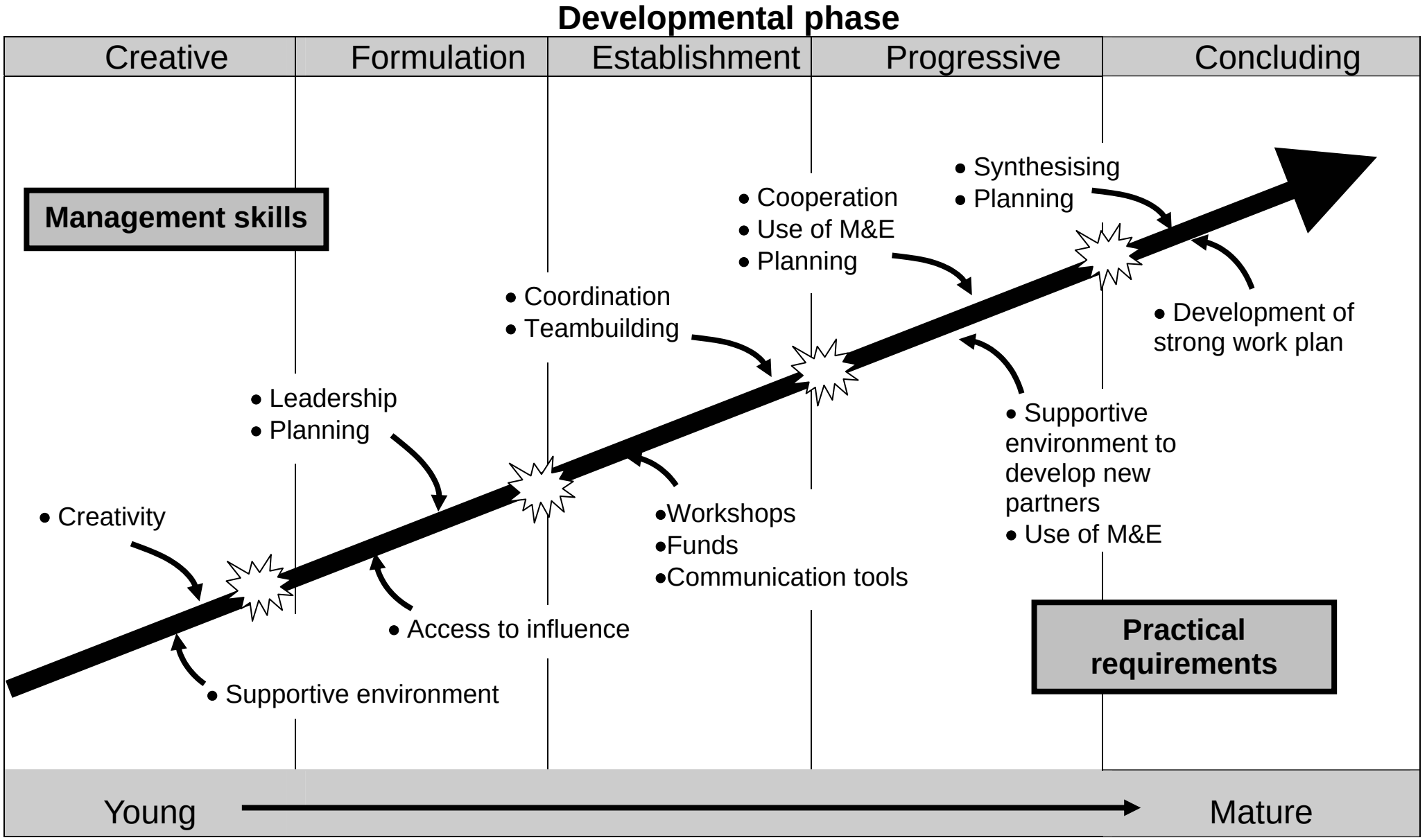


FIGURE 7 *A model of network development (modified from Greiner 1998*). Key point of change

3. CASE STUDIES

3.1 Case study assessment

Introduction

A number of organisations and networks were selected as case studies in order to examine their structural approaches to research. There were two principal objectives of assessing the different examples. Firstly, the question of the suitability of networks or individual projects was assessed using the information and tools produced from the study and secondly, the case studies provided an opportunity to understand better the issues related to research structure and thereby refine the assessment process so that it could be useful in other situations.

The approach taken was to combine stakeholder interviews about the research process and its impact with a general review of organisational structure. The case study evaluation aimed to gain an overall indication of how organisations decided on which approach to take to research, how they managed that approach, how effective they were in using that approach, and how they planned to develop their programmes in the future. However it is important to state that it was not the objective of the study to undertake an in-depth review of any organisation. Organisations and individuals who were willing to give up their time and provide information to the study did so on the strict understanding that the report would not contain a highly critical analysis of their operations. The case study analysis relied completely on the goodwill of the organisations that took part and was not undertaken to highlight failings in any individual r organisation. It was intended that the assessment of case studies would highlight key points in relation to motives, challenges and approaches to research. As a consequence, the discussion of results (section 3.2) deliberately avoids attribution of negative findings to any individual or organisation. While this may disappoint the reader it is important to remember that without such an agreement between researcher and organisation the case study assessment would have been extremely limited.

The interviews were largely conducted with researchers and managers, not farmers (with the exception of farmers working with BAIF in India). Several key informant interviewees cautioned against focussing on meetings with farmers in a study of this size and duration. They suggested likely problems over the lack of time available to build enough trust between scientists, NGOs and farmers to produce accurate responses to questions.

Case study design

The methodology used in the case study assessment was designed to answer several key questions that it was hoped would in turn give an indication of the appropriateness of networks or individual projects in pursuing research objectives. A series of semi-structured interviews was carried out with key figures in each organisation (Appendix 1) based around a core set of issues, namely:

- *Determination of research structure*
- *Evaluation of research structure*
- *Developmental stage of the project*

The questions were designed to indicate the relevance of the approach to research at both the individual and organisational level. In addition, within these broad categories further divisions were made in order to gain insight into the impact of the chosen approach to research on a range of specific criteria. These criteria were selected following a review of

impact evaluation methods employed in business to assess key areas of research impact at the individual and organisational level (i.e. balanced scorecard, triple bottom line and relative value) (see section 2.5).

Determination of research structure

The objective of investigating the basis for choosing a particular research strategy was to identify if there were key features that pre-determined whether networks or individual projects were more appropriate. Questions focussed on the scientific characteristics of the researchable issue, the particular objectives of the supporting or coordinating agency and any practical limitations encountered in either the establishment or practice of the research programme.

Evaluation of research structure

Questions surrounding the evaluation of research structure were designed to assess the impact of research at the individual and organisational levels as follows:

- At the individual level questions were designed to identify the impact of the research on:
    - Human capital
    - Social capital
    - Natural capital
    - Financial capital
- At the organisational level questions were designed to identify the impact of the research on:
    - Physical capital
    - Research 'reach'
    - Partner satisfaction
    - Knowledge management and organisational learning
    - Potential for development

Developmental stage of the project

The model developed in section 2.5 was designed for use in the case study analysis to assess the developmental stage of the project. In addition, it was planned that the model would provide enough information to help determine the future development of the project.

Case study subjects

The organisations and individuals selected for inclusion in the case study analysis were chosen to cover a wide range of types and approaches to research. Selections ranged from large international organisations supported by a multitude of donors to small NGOs. The common feature that all shared was an interest in undertaking collaborative research. The subjects selected provided the potential to look at a variety of research issues and a range of approaches to their investigation. While it would have been possible to investigate a much larger number of forestry research networks this was deliberately avoided as it was felt that there would be too many issues in common with consequently similar approached to their resolution. Likewise the number of case studies was not designed to be exhaustive but to provide the variation required to investigate the central issue of options for management of collaborative research.

The organisations participating in the case study analysis are listed in Table 4. A more detailed profile of each organisation is presented in Appendix 1.

TABLE 4 *Organisations that participated in the case study assessment*

Organisation or network	Location	Acronym used in report
Agharkar Research Institute	Pune, India	ARI
Association of Forest Research Institutes in Eastern Africa	Machakos, Kenya	AFREA
BAIF Development Foundation	Pune, India	BAIF
European Forest Genetics Network	Rome, Italy	EUFORGEN
Evaluation of microsymbiont use with *Calliandra*	Dakar, Senegal	EU/INCO DEV project 37766
The Food and Agriculture Organisation of the United Nations	Rome, Italy	FAO
Forages for Smallholders Programme	Los Banos, Philippines	FSP
Green Foundation	Bangalore, India	-
Institute for Forest Genetics and Tree Breeding	Coimbatore, India	IFGTB
Integration of tree crops into farming systems project	Nairobi, Kenya	ITCFSP
International Centre for Research in Agroforestry	Nairobi, Kenya	ICRAF
International Neem Network	Coimbatore, India	INN
International Plant Genetics Resource Institute	Rome, Italy	IPGRI
National Chemical Laboratory	Pune, India	NCL
Neem Foundation	Bombay, India	-
Regional Centre for Training in Community Forestry	Bangkok, Thailand	RECOFTC
Regional Land Use Management Unit	Nairobi, Kenya	RELMA
Southern Africa Forest Genetics Research Network	Rome, Italy	SAFORGEN
Tamil Nadu Agricultural University	Tamil Nadu, India	TNAU

3.2 Results and discussion

Introduction

All of the organisations included in the case study assessment were involved in a range of research activities managed either as individual projects or, in most cases, networks. The assessment investigated reasons for the approaches adopted in each organisation's research programmes by asking questions the scientific characteristics of the researchable issue, the particular objectives of the supporting or coordinating agency and the practical limitations surrounding each case.

While it is relatively easy to highlight research issues that should be addressed by networks it is much more difficult to identify those currently being addressed by networks that would be more effectively addressed within individual projects. This is because while experimental design is the key scientific determinant in selecting networking as a research strategy, the main features that support the selection of individual projects tend to be either practical limitations or policy issues relating to the organisation itself or the donor (for example, need for institutional strengthening, particular strengths within the organisation or dislike of collaborative research). This means that in some cases decisions to support individual projects can be very difficult to make, particularly for donor agencies, as they are by their nature less well defined and frequently require detailed knowledge of the research environment in which the work is due to take place.

Reasons for using individual projects

The analysis indicated that while there was an overriding interest in networks and networking there were nonetheless several examples of individual projects that were determined by scientific or practical, rather than policy-based, considerations. Some of these were characterised by a focus on local impacts (e.g. nursery development by BAIF, evaluation of a propagation technology by ICRAF and evaluation of local tree species by TNAU) while in other cases a non-network approach was selected in order to capitalise on local expertise (e.g. species trials at TNAU and neem research at the National Chemical Lab, Pune). In each of these cases the organisations concerned were familiar with networking but felt that there were no perceived benefits of collaborating with partners outside the immediate environment. Principal reasons for supporting individual projects were the focus on local impacts, the ease of organisation (particularly decision-making) and ability to control the research agenda.

Reasons for using networks

In most cases organisations were involved in networking activities of one sort or another based on the need to utilise multiple experimental sites or multiple partners. In some instances becoming part of the network was the only way to access resources (e.g. TNAU and IFGTB as part of the International Neem Network) but in many other cases the organisation was either the founding member of a network or its coordinating partner (e.g. FSP, IPGRI with SAFORGEN, and ICRAF with the AFRENAs). In these cases a positive decision was made to adopt or establish a networking strategy based on a combination of factors. The two most important of which were the limitations of resources available to any one organisation and the organisation's history of collaboration.

In many cases a networking strategy was adopted because the objectives of the research project were impossible to achieve using the individual resources of any one organisation. Networking provided an opportunity to utilise a wider range of experimental sites, partner expertise and access to a wider range of uptake pathways. This approach proved particularly important for output-focused networks where experimental design determined the

need for multiple sites (e.g. ICRAF's ASB programme, EUFORGEN, International Neem Network), or to achieve better uptake of results through the involvement of a large number or locally influential partners(e.g. BAIF, RLUMU, SAFORGEN). In these examples the necessity of adopting a networking approach was stressed by many participants. The general view was that there was no option to carrying out an effective research programme, particularly in diverse environments and with a wide range of partners. Peter Horne of FSP summed-up this view in stating "We are dealing in very diverse and volatile environments. In these conditions the diversity of the partners and the target group requires the establishment of a network".

If the organisation had previously been perceived as successful in its involvement in networks this was generally taken as a strong indication that networking was a research strategy that could or should be pursued. However, this attitude suffered from two main drawbacks. Firstly, network performance, if evaluated at all, was generally assessed in simple quantitative terms related to project outputs or structural indicators such as number of partners. As such perceived success was not necessarily a good foundation for future planning. The second limitation was that assumptions about either objectives or strategies that did not take account of end users needs produced a limited view of the factors needed to progress. A good example of this was provided by a comparison of approaches between FSP and BAIF's collaboration with KfW. Both organisations have an extremely good reputation amongst collaborators for their participatory approach and level of success in providing assistance to rural development. In most cases both organisations place a great deal of emphasis on participatory needs assessment as an integral part of project planning. This is typically carried out by focussing early effort in meeting farmers and farmers' organisations to discuss needs and has helped build their reputations as credible organisations with farmers, NGOs, and donors. In FSP's approach to encourage use of tree fodder in southeast Asia they placed great emphasis on incorporating participatory needs assessment through the following steps:

1. Farmers diagnosing their own problems
2. Identifying actual or expected impacts
3. Suggesting ways of how they themselves can tell whether there have been any changes in those impacts (+ or -)
4. FSP then works with them to monitor their perception over time (either from one point in time looking back or, preferably, on at least two occasions).

In comparison, in BAIF's association with KfW on the development of gliricida with farmers in India it had not been possible to conduct the participatory needs assessment. The result was that while both projects maintained a high level of participatory management the farmers in BAIF's project with KfW repeatedly stated that GS was not a priority species [9].

The other most important scientific or practical factor determining whether or not to pursue networking was the level of networking that had previously been associated with the particular subject, and the level of its success. An example of this is how neem research is undertaken in India. The national importance of neem in India has created a large number of research initiatives within the public and private sector. Communication between these has been facilitated through various initiatives including the Neem Foundation (an international NGO), the International Neem Network (an international scientific network administered through the Indian Council for Forestry Research and Education), the national neem research programme conducted at the Institute for Forest Genetics and Tree Breeding (a

[9] It is important to note that BAIF have investigated and promoted the use of GS in India for 15 years and have played a central part in the successful adoption of the species both nationally and internationally. It is normal practice in their programmes to conduct rigorous participatory needs assessment prior to project implementation and the example chosen does not reflect their normal operational approach.

state-funded national research agency) and the National Oilseeds & Vegetable Oil Development Board (NOVOD Board - a joint state and privately-funded agency operating with 11 organisations at a national level). The establishment of the networks and the connections that exist between them have occurred partly as a response to the nature of the research subject (mainly the need to utilise experimental sites and partner expertise) and partly as a response to the success of networking on the issue of neem research in India (principally the perceived success in some quarters of International Neem Network) rather than solely a management decision to create a networking structure.

Another commonly-stated reason stated for initiating networks was a failure of other approaches. For example, the ITFSP programme was based on the failure of direct approaches to implementing research results previously attempted by GTZ in Africa. In this case evaluation revealed that technologies had been developed successfully but that there was a lack of extension of results. Network management has concentrated on working with extension agents to develop knowledge pathways.

Interrelating networks

Networks can also combine, overlap or work within each other and Neem research in India provides an interesting example of how individual research projects can work successfully within an overall framework of interrelating networks. ICRAF's network management strategy includes global, regional and country programmes interacting at different levels with international, regional and local networks. (ICRAF's gradual withdrawal from its AFRENA's and their adoption by ASARECA is not an indication of the lack of success of a networking strategy but more of an indication of both the increasing strength of ASARECA and ICRAF's desire to support regional research initiatives). ITCFSP suggest that networks are most effective when operating within a clearly defined framework with easily identifiable links between key network participants. In this way small networks, which are often the most effective are able to transfer information effectively to larger networks that are more effective at information dissemination.

Individual projects can in some cases be seen as precursors for networks, or provide an opportunity for an organisation to develop its skills and contacts before joining a network. For example, IFGTB's involvement in neem research led to FORTIP's invitation to them to join the International Neem Network.

Perceptions of the benefits of networking

Networks were generally seen as a logical progression from individual projects by managers, coordinators and scientists. Farmers appeared, not surprisingly, unaware and unconcerned about research structures involved in delivery of results. Researchers and farmers associated with programmes coordinated by BAIF, ICRAF and FSP expressed the view that from a farmer's perspective there is no obvious added value of networks. Results are made available through structures that are independent of networks such as from local NGOs and extension services, not from big networks. It is how the networks relate to the NGOs and extension services that is crucial to provision of results. For example ICRAF collaborates with a Department of Agriculture which in turn coordinates the "catchments groups" that include farmers. Although ICRAF can work directly with farmers the above structure is the normal method of communication.

The benefits of networking stated by individuals operating at different levels within a network were listed as follows:

Managers and coordinators
- Raising organisational profile through involvement in international initiatives
- Increase lobbying strength at national or international level
- Ability to undertake more meaningful research
- Increased influence within an organisation
- Access to donor funds

Network participants (scientists)
- Raising their personal profile through involvement in international initiatives
- Access to resources of other partners
  - Material
  - Personnel

Network participants (farmers)
- Access to materials (e.g. seedlings) and advice (e.g. silviculture and management)
- Access to partners who might provide future funds
- Access to social networks

Participation

A participatory approach to network management was rated as a principal objective by several organisations. Consultation with NGOs and farmers and establishment of training days were seen as cornerstones to operational practices by the ITCFSP, the Neem Foundation, FSP, BAIF and TNAU. Other networks admitted to a poor level of information sharing and virtually no consultation with end users. In some cases there was no facility to work outside a small group of scientists while the poor level of participation by farmers in at least two networks was attributed to poor network coordination. In one network it was clear that the principal means of evaluating success was the establishment of an international series of field trials that provided no incentive to participation in the network by end users even at the stage of priority setting.

There was no clear relationship between funding source and level of participation. However, in some institutions participation appeared to be given a higher priority depending on the source of funding, for example at TNAU funding from Tamil Nadu state gave a high priority to participation throughout projects in contrast to funding from ICFRE which determined project objectives itself.

Size and composition of a network

RELMA expressed the view that network success is very much dependent upon the correct representation of organisations. The size of the network and the dynamic created were seen as being key factors in how the network progressed. They prefer to restrict network size to about five key strategic participants. The Green Foundation and RELMA also considered small networks to be most effective in terms of being able to concentrate on one issue and increase impact rather than spread themselves widely into several areas as they perceive other organisations to have done. They also expressed frustration that donors tend to prefer larger projects due to the lower administration costs and the larger impacts. BAIF considered small networks (consisting of a low number of small NGO partners) generally not to be cost effective due to the relatively high administrative cost. They also felt that many small networks were also highly ineffectual. While BAIF works with, and also trains, many small NGOs it does so in carefully selected programmes, for example the National Environmental Awareness Campaign, where larger agencies have been asked to help administer smaller ones.

The main benefit of larger networks was perceived to lie in their capture of a wide range of partner expertise. This was deemed to be particularly important in areas where there

networks were small or in subjects that lacked specialists (e.g. agroforestry). AFRENAs were established with a relatively low level of available expertise, therefore a networking approach was essential to increase the available skills. Another benefit of large networks, stated by AFREA, was their ability to support weaker countries (in their case Burundi, Rwanda and Ethiopia).

A dilemma concerning network size was mentioned by several interviewees. While all agreed that one of the main advantages of networks was their ability to effectively reach many organisations and individuals it was also accepted that the most effective networks were those that supported the strongest organisations. This view confirmed a view that the criteria of network success largely ignored the benefits of human and social capital.

Donor support

While maintaining a good relationship with donors was cited as one of the most important elements of network management, the manner in which the support was made available was questioned by several interviewees. In some cases donors have to work through intermediary agencies (e.g. ASARECA in Africa) rather than directly with the organisations. This can be good from the donor perspective as it simplifies the process of research support but it can be problematic if the intermediary agency has different priorities to either the donor or potential partner (for example ASARECA's current prioritisation of agriculture but not forestry).

There was general agreement that donor support for national partners rather than providing funds directly to NGOs had several benefits including the following:

- National organisations can have a greater understanding of the relevance of regional differences.
- Linking with national organisations can give credibility to the network.
- National organisations generally have a greater permanence, thereby providing better records and provision of information in the future.

However, concern was expressed by one donor that in some cases collaboration with scientists was hampered by having to work only with higher levels of management who had little idea of the needs of either scientists or farmers. Furthermore, the weakness of national partners had clearly encouraged some funding agencies to go directly to NGOs thereby potentially further weakening national partners' capabilities. The opposite view was also expressed that national priorities showed little relevance to local needs and as such donors should allow greater inputs from local collaborators in project development. One interviewee even proposed that donors should confine themselves to "flagship" themes and allow local organisations to develop research programmes. Questions were also raised regarding the potential for donor support to be targeted at research activities that could most easily demonstrate impact rather than at strengthening research capability.

Several organisations expressed the need for donors to provide more support for strengthening relationships between partners. Lack of familiarity amongst partners and poor levels of communication between scientists and national partners were considered to be major obstacles to improving network effectiveness.

Coordinators

The role of the coordinator, or coordinating panel, was seen as a major issue determining the success of research. Weak coordination, particularly the inability to resolve political differences between partners, was considered to be a major problem with networking.

Conversely, a dynamic coordinator who had a good relationship with donors, scientists and facilitating agencies was considered by some organisations to be the most important factor in network success.

Several interviewees suggested that the strongest networks were considered to be those based on personal contacts rather than institutional ones where participants are chosen on their ability to contribute rather than their affiliation to a particular organisation. This approach to network management combines strong personal relationships with a degree of flexibility that would not be possible in networks where it was not possible to remove poorly performing institutions. A limitation of this approach is that it may be too heavily focussed on individual rather than institutional strengthening. Such networks can be large or small.
ITCFSP highlighted the importance of partner linkages but emphasised the need to break ties if necessary for the good of the project. The main problem with this approach to management is that networks can become very political and run the risk of becoming less participatory.

Evaluation of impact of research structure

Although in some cases the choice of networks or individual projects is determined by scientific criteria in most cases the selection of a particular course of action is determined by a combination of experimental and policy issues. Listing these is a relatively straightforward process that can be transferred and utilised in other situations. However, as stated above, decisions relating to the utilisation of networks are rarely based on clear evidence of success of the networking process and usually employ fairly superficial indicators of outputs. What is far more interesting and important in terms of future policy decisions is to accept that we need to improve our ability to evaluate the benefits of networks and individual projects.

Human capital

The influence on human capital of different organisations' approaches to research was investigated by considering the effects of research on the skills and knowledge of participants, particularly end users. The type of skills and knowledge produced and transferred varied enormously from understanding the benefits of an introduced tree species to adopting different approaches for information transfer. End users were considered to cover all levels within the research and development structure. In some cases farmers were the target group (e.g. FSP, BAIF and DTZ), in other it was NGOs (e.g. RECOFTC) or scientists (e.g. EUFORGEN and SAFORGEN), while in others it was policy makers (e.g. Green Foundation). Within such a complex framework of knowledge type, uptake pathway and end user it was not possible to make detailed comparison so the analysis focussed on the success of each approach.

While it was not possible to compare in a quantitative manner the level of success at developing human capital between such widely differing target groups, types of knowledge and means of knowledge transfer, it was possible to identify key features in approaches that proved effective. The level of success of knowledge transfer at each level designed at improving human capital was determined by the following three factors:

- Participation
- Facilitation
- Quality of information and means of dissemination

The level of participation by stakeholders, at whatever level within the research structure, is essential in determining the potential scope for knowledge transfer. Approaches that encouraged participation (e.g. the programmes of farmer training days undertaken by TNAU,

FSP and BAIF) inevitably provided the opportunity for transfer of explicit knowledge from scientists and NGOs to farmers. Of equal importance were the opportunities provided by close interaction with farmers, particularly on a one-to-one level, that provided the potential for transfer of tacit knowledge from farmers to NGOs and scientists. These were less common in the examples studies but appeared to provide valuable additional human capital at the level of scientists, and finally policy makers, in the assessment of the operation of FSP. In this case there is a clearly expressed view amongst the policy makers and scientists who determine the structure of the programme that it will be most effective by taking account of farmer's needs through their participation in priority setting and local management.

The quality of facilitation of information and knowledge transfer was cited by several interviewees as essential to the success of improvement of their knowledge. Both poor facilitators and poorly constructed training days were given as examples of obstacles to skills improvement. In addition, the personal skills required by facilitators between each managerial level was constantly stressed. Qualities such as tact, patience, cultural understanding and forcefulness were quoted as key skills required by anyone facilitating knowledge transfer. Several interviewees also pointed out that these skills were only required in a small number of people involved in the information transfer process; namely the coordinator and the principal links between different managerial levels.

Different modes of information transfer were used amongst the case studies including two-way discussion, one-way oral presentation or demonstration, provision of leaflets and videos, and radio broadcasts. The quality of information transferred and the means of transfer were considered together as it became clear that these two facts were intimately connected in the absorption of information and development of knowledge. While the limited sample size meant that it was not possible to be certain that the level of adoption of the same information varied depending its mode of presentation (e.g. in personal discussion when compared to a radio broadcast), several interviewees indicated that they had made a decision on the use of a particular approach to information transfer based on its success. However, as farmers did not form a major part of the case study evaluation process it was not possible to get first-hand reaction to the quality of information that they received. (The farmers that were interviewed (as part of the assessment of BAIF) were illiterate and only had the opportunity to receive explicit knowledge through discussion). It was therefore necessary to use an indirect approach of examining the views of information providers rather information receivers. Through these discussions it became obvious that there was an inverse relationship between knowledge transfer options and their importance. Higher managerial levels, such as policy makers and scientists, generally have several options for receiving information and knowledge and therefore have the potential to select and compare their quality and relevance. On the other hand, target groups, in this case farmers, are unlikely to have many options open to them by which they can receive information. As such, the average potential impact of information sources is higher. While this does not indicate which were the most successful approaches, or the type of information desired by farmers, it highlights the need for evaluation of farmers' views on approaches to develop their skills and knowledge. Without the type of in-depth analysis that examines options for information provision and takes account of farmer's needs the current situation will prevail where the section of the quality of information provide and the means of information provision are taken by information providers with little evidence upon which to base their decisions.

Any attempt to compare networks and individual projects in terms of their ability to develop human capital is hindered by the lack of distinction between the two approaches to research. However, in spite of the blurred middle ground between the two, it is possible to draw some conclusions that apply in general cases.

In order for information to be absorbed by individuals and turned into knowledge the individuals concerned have to participate within the structure of information pathways created

within either the network or the individual project. As discussed previously, the creation of this 'domain of knowledge' is the starting point from which human capital can develop. The creation of a community within which relationships of mutual engagement develop that bind members together into a social entity is essential to the development of a 'domain of knowledge' (see section 2.4). In this respect it would be easy to draw the conclusion that networks are more effective in developing human capital than individual projects through their ability to characteristically accommodate a greater number of information pathways. However, the facility to interact regularly and engage in joint activities that build relationship and trust that in turn encourage the development of skills and knowledge is not solely a consequence of the number of participants. The importance of participation in improving human capital is also determined by the effectiveness of the relationships created. In this regard individual projects, or even small networks, may have an advantage over large networks with respect to their characteristic ability to utilise existing relationships. While individual projects can immediately capitalise on contacts made, often on a local level, larger networks may have to invest effort in establishing and developing new contacts which may increase the time it takes for the network to become fully functional.

In order to determine clear differences between networks and individual projects in terms of their respective abilities to foster facilitation it is necessary to focus upon their ability to draw upon facilitation skills. In theory, networks may have an advantage over individual projects if they can access and utilise a greater range o facilitation skills. However, the level of facilitation skills that are required, particularly those necessary to form the link between practice and the continued development of the domain of knowledge may be less for individual projects where participants may be better known to each other.

This influence of the level of existing relationships, in terms of their ability to support knowledge transfer, is also of key importance in term of the means of disseminating information. Once again, there is no inherent quality of networks or individual projects that determines their ability to disseminate information but knowledge of existing means of information transfer and an ability to utilise them may be stronger in individual projects that are locally based.

The development of human capital within an overall livelihoods context tends to be associated with farmers but training at other level of technical expertise can also provide valuable inputs to increasing skills and knowledge. The ability of networks and individual projects can achieve personal development of skills and knowledge is related more the objectives of the work and its structure than to any inherent difference between the two approaches. In the case studies, both formal and informal technical training was evident in the networks and individual projects, although it could be argued that the increased ability of many networks to reach collaborators even at the technical level would tend to indicate their greater ability to improve human capital at this level. Conversely, investment of effort in creating a few highly effective knowledge pathways at a local level may be more effective. For example, IFGTB manage to provide technical and training support to industry. They provide a bridge between research and users and are therefore an important link in the information process.

The preceding discussion suggests several advantages of individual projects in comparison with networks when attempting to enhance human capital. However, when considering each of the parameters above it is important to point out that the overriding factor determining development of human capital is the quality of the participation, facilitation, type of information and means of dissemination. Effective involvement of participants and provision of valuable information are not inextricably linked to one approach rather than the other and in this respect a good network can be more effective than a poor individual project, and vice versa. A good example of the difficulties involved in attempting to determine the role of research structure in strengthening human capital is provided by BAIF's activities in its Tribal

Rehabilitation Programme. Tribals in India have characteristically migrated from their villages or settlements at various times of the year in order to find work. In most cases this is the men, but in some situations other members of the community may leave for periods of up to several months in order to provide income at periods when they are unable to produce enough food on their own land. Lack of land tenure and poor farming methods have combined to produce a situation where tribals perpetuate unsustainable approaches to and management. The focus of the Tribal Rehabilitation Programme has been to develop farming systems that are more productive and sustainable while at the same time attempting to address some of the land tenure issues. Part of this programme has involved the introduction of the fodder tree *Gliricidia sepium*. The tremendous impact that BIAF's programmes has had on improving farm productivity has led to a reduced need for tribals to leave their farms in order to earn income. Although there has been no attempt to measure the impact of these changes in terms of human capital there is no doubt that the many successes within the programme are based on improved skills and knowledge leading to a stronger community. While it is tempting to attribute the outputs, uptake and impact to the strength of BIAF in both international and national networking with *G. sepium*, closer analysis suggests that this may be a simplification of the picture. Networking has played a central role in both the identification of the qualities of superior provenances of *G. sepium* (through the OFI-coordinated *G. sepium* international provenance trial network) and in BAIF's ability to promote the superior provenances within India. The backbone of BAIF's approach has been the provision of improved germplasm to farmers and a focus on improving their human capital through training. However, while the provision of the 'tools' for livelihood improvement (improved germplasm and training material) was dependent upon networking the tremendous improvements in human capital witnessed in the Tribal Rehabilitation Programme are strongly related to the individual personal relationships built between BAIF staff, extension workers and farmers. While this in itself could be considered a network, the strength and importance of the links are not in themselves a function of networking. The relevance of this example is that it highlights both the blurred line between networks and individual projects and the fact that many programmes require both approaches to achieve their objectives.

Social capital

Enhancing social capital by creating new contacts, establishing relationships of trust and providing access to other institutions is an activity that is perfectly suited to networks. The collaborative structure that is created and enhanced by networks provides the opportunity for individuals to meet, exchange ideas, create social bonds and strengthen their social networks.

Research networks assist in enhancing social capital through their activities rather than through their outputs. Networks provide the potential for individuals to interact either in new relationships or in a new manner within existing relationships through their ability to reach new partners and their philosophy of sharing information. The case study assessments confirmed the view that research networks tend to have a relatively minor role to play in strengthening or developing *bonding social capital*. In general the links created did not focus on immediate family members, neighbours and close friends but were more concerned with communicating with target groups that focused on increasing explicit knowledge in particular subject areas. In some cases these links strengthened *bridging social capital* by establishing or enhancing relationships between groups of similar status at a similar organisational level, for example, between scientists in the EU project, or between organisations, as in AFREA, or a combination of the two, as was the case with SAFORGEN. In other cases there was a significant element of strengthening *bridging social capital* where the focus was on linking groups at different organisational levels such as farmers and scientists, with FSP and ITCFSP.

The limited sample size, determined by the main objectives of the case study assessment, did not permit an analysis of the importance of the different types of social capital in determining the impact of research outputs. However, it would be extremely interesting to carry out an extensive investigation specifically designed to examine the relative roles of bonding, bridging and linking social capital and their relationship to mechanisms of knowledge transfer in relation to increasing impact of research activities. In this study it was not possible to indicate through direct evaluation which was the most important type of social capital. Indirect means, through general discussions with interviewees, were used and revealed the perception of importance of developing bridging social capital, particularly between scientists, extension workers and farmers. The creation of a network of trust was highlighted by several interviewees (at the scientist level) as one of the most important factors governing network success. Some past failures in supporting rural livelihoods were seen as being related to a donor focus on 'delivering' or 'providing' research results without much thought regarding whether there was a demand for that information from farmers. Direct evidence of this was provided in the operational changes described by both RLUMU and ITCFSP, whereby they both focus strongly on user-defined needs, were reported as an indication of increased levels of trust with farmers. Other examples of the importance of bridging social capital were provided by the Neem Foundation and Green Foundation, both of whom felt that small NGOs felt a sense of empowerment in their activities through their association with larger organisations and networks.

Unlike the development of human capital, it would appear that networks have a distinct advantage over individual projects in terms of strengthening social capital (particularly bridging and linking social capital). However, this is purely a reflection of network's characteristic ability to increase research 'reach' and is not an indication of any inherent differences in processes that occur within networks and individual projects.

Natural capital

While research in forestry might at first appear to be focussed clearly on improving the natural resources that are useful to livelihoods such as land, water, wildlife, biodiversity and environmental resources, few of the interviewees mentioned enhancing natural capital as their principal objective. Organisations and networks including ICRAF, ITCFSP, IPGRI, and BAIF focus on increasing tree planting, conservation of genetic resources and environmental management through their activities but this tends to be within a complex framework of related activities directed towards overall livelihoods improvement. This relationship was illustrated most clearly by FSP, where they define the enhancement of natural capital principally as a means to secure improvements to other capital assets such as social and human capital. It was only in the networks comprising EUFORGEN and SAFORGEN that improving natural capital (mainly through the conservation and development of genetic resources) was the focus of activities.

No evidence was forthcoming that networks were more effective in enhancing natural capital when compared with individual projects beyond their ability to encompass a greater number of partners. While this may be considered justification enough to support networks in pursuit of enhancing natural capital it should be remembered that, in common with the findings related to human capital, a poorly run network is unlikely to have as much impact as a well run individual project.

Financial capital

Given the emphasis placed by donors on economic indicators of success it may seem surprising that evidence of impact of research activities on financial capital were generally hard to find. This was situation was attributable in part to the general lack of focus on

research evaluation present amongst researchers but was also a reflection of the organisations selected and the manner of the evaluation. While many of the organisations included in the case study analysis included an increase in financial capital amongst their objectives, others such as the Green Foundation, the Neem Foundation were more concerned with supporting the development of research and supporting institutional strengthening activities. Some of the organisations included in the study, such as the Agharkar Research Institute and the National Chemical Laboratory in Pune, were undoubtedly focused towards financial benefits but because they were part of a chain of delivery of results they were not evaluated in terms of financial criteria. In addition, many of the interviewees were involved in the day-to-day running of the research programmes and as such tended to be able to identify more easily with improvements evident at the operational level (i.e. social and human capital) rather than improvements to financial capital which might lie towards the end of the project.

There were however some examples of projects that emphasised the income earning potential of some of the activities under their umbrella. From these examples it was possible to identify two types of capital assets: direct and indirect. Direct capital assets were derived from products that could be sold either to neighbouring farmers or through a market, for example animals raised on fodder produced in projects. Indirect capital assets were considered to be those that either contributed to direct capital assets (e.g. tree leaves used for animal fodder) or that contributed to on-farm productivity thereby reducing capital outflow (e.g. tree leaves used for fertiliser, and on-farm firewood production).

While it was possible to identify a projects' ability to produce capital assets, and to determine whether these were direct or indirect, there was no indication that this was related to whether research was conducted as part of a network or an individual project. The projects that focussed effort on enhancing financial capital (e.g. ICRAF, FSP, BAIF, ITCFSP) appeared to be successful and undoubtedly owed much of their success to previous networking activities (principally in tree species and provenance evaluation) but the activities' ability to provide financial capital was not in itself inextricably linked to networking.

Physical capital

None of the organisations included in the case study analysis focussed on improving basic infrastructure of transport, shelter, water, energy and communications. As such it was not appropriate to consider enhancement of physical capital in the assessment.

Research 'reach'

The ability to contact large numbers of researchers, NGOs and farmers is an area where networks, by their nature, are generally more successful than individual projects. This ability to contact end users, termed 'reach' by Bernard (1995), provides networks with an ability to strengthen information pathways both qualitatively and quantitatively in a manner that is not possible with many, particularly smaller, individual projects. This becomes increasingly important further down the information pathway as in many cases networks provide the only contact with farmers and farmers' groups. For example, both BAIF and FSP reported the manner in which their networks were able to work with farmers in the most remote areas due to the inclusion in the network of a wide range of NGO partners. This approach increasingly utilises existing contacts, particularly informal social networks, the further out they go. Individual projects, by their nature, do not develop as many social contacts and are therefore less likely to be able to attain the same level of contact with target groups. From a donor perspective this highlights the exceptionally valuable role that networks can play in disseminating research results.

Increasing research reach can be achieved through means other than simply focussing on network size. The Neem Foundation have concentrated on creating a management structure that deliberately devolved powers of decision-making and distribution of funds to national nodes rather than centralising activities. While this does not necessarily increase the size of the network immediately the improved perception of ownership by NGO partners is likely to stimulate activity at a local level.

The decreasing reliance on personal contact to transfer information created by the growth in electronic media may appear to provide increased opportunities for increasing research reach. However, the impact of such 'remote' contact was not verified (e.g. TNAUs weekly broadcast on All India Radio) and may also only be suitable at certain organisational levels. For example The Neem Foundation's extensive use of the internet to coordinate activities and publish information may work at the scientist and even NGO level but has little value in transferring knowledge to farmers. The relationship between extending research reach and the use of dissemination media was further highlighted by several farmers interviewed in India who maintained that they preferred training days to one-to-one contact with extension agents.

Partner satisfaction

The views of partners in relation to the success of research projects are frequently overlooked in the evaluation process. Lack of participation in decision-making and implementation by end users was cited as the cause for lack of impact in projects that acted as precursors for both ITCFSP and RLUMU. In each case the experience of poor relationships between scientists and extension agents and the subsequent lack of impact led to the recognition of the need to initiate participatory research. Both programmes acknowledge that feedback from participants (what would be termed client satisfaction in business) is essential to their plans for programme development and have adopted participatory approaches to decision-making.

There appeared to be no standardized approach to assessment of partner satisfaction between organisations, and even within organisations, and most appeared to rely on the initiative of the researchers concerned. In a few cases (most notably RMULU, FSP, ICRAF, ITCFSP and BAIF) formal mechanism existed to incorporate farmers' views on project success where meetings were arranged on either a group or individual basis to determine strengths and weaknesses of both project and the management approach. This approach not only provided a mechanism for feedback but clearly created credibility for the organisations concerned. In addition, several interviewees from these organisations reported the need for such an approach to create a feeling of project ownership and involvement by farmers. A further benefit of incorporating the views of network partners was reported as the strengthening of relationships with extension agencies. Communication and the formation of strong links with extension agencies was often cited as the most important relationship affecting network success and investment in this relationship was considered to be likely to enhance the potential for further involvement with farmers in later initiatives.

In contrast, several organisations involved in the case study assessment had no formal approach to identifying views of farmers or even collaborating scientists. Some felt it was not necessary and that the coordinator was best placed to determine whether the project was succeeding while others used informal approaches which inevitably resulted in a lack of farmer input.

In theory measuring partner satisfaction should provide an indication of which situations networks or individual projects were more successful. However, the small number of organisations encountered in the case study assessment that use partner satisfaction as a

measure of project success, and the fact that they were all involved in network activities meant that such a comparison was not possible.

Information needs of the poor

The earlier discussion of the general lack of participatory needs assessment amongst the case studies indicates that the information needs of the poor were either not included in project planning or given a low priority in most examples investigated. While this is not necessarily a criticism of the management processes, because farmers were not always identified as the main target group, it suggests the need to reconsider project prioritisation processes.

Notable exceptions to this were ICRAF, FSC, BAIF and ITCFSP, each of whom targeted resources at meetings with farmers prior to project initiation in order to both understand their needs and indicate what information and resources they could offer. One-to-one interviews and group discussions revealed farmers' views on general issues related to livelihood enhancement (i.e. factors limiting development) and specific points on species of interest.

The different sizes and organisational structures of networks and individual projects mean that it is not possible to determine which is better at identifying farmers' information needs. Although networking is by definition a process of collaborative action based on utilising a communication structure it does not necessarily follow that networks are more effective in identifying farmers' needs. The case studies indicated examples where networks were able to draw on a wide range of intermediaries to facilitate farmers' needs assessment but this was an indication of the effectiveness of the networks concerned rather than illustrating an advantage of networking as a process. Well-managed individual projects have the potential to be equally as effective.

Knowledge management and information flow

Chapter 2 pointed out that knowledge flows between different levels in an organisation or network and the manner in which learning takes place at each level are crucial to overall learning for both the individual and the organisation. Figure 3 (in section 2.2) indicated that within each level or an organisation learning takes place in a cyclical manner, incorporating stages of experiencing, processing, interpreting and taking action. Furthermore, knowledge transfer between levels was hypothesised as occurring through the mechanisms of socialization, externalisation, combination and internalisation. The case study analysis used this structure to evaluate the relative success of different projects in terms of knowledge management.

One of the main challenges of a network or an individual project is how to turn tacit or implicit knowledge into explicit knowledge. The case study analysis found that networks could be particularly good at tapping into this type of knowledge because they depend so heavily on communication, and tacit knowledge often only comes to light in conversation or informal communication. Although one of the principal challenges of forestry developmental research in many areas is farmers' unfamiliarity with tree cultivation, there is still a pool of undocumented implicit knowledge on tree use and interaction with crops that is essential to incorporate into tree planting projects.

The degree of interest in examining the amount of tacit knowledge held by farmers and their level of socialization, or sharing of the knowledge, varied amongst the case studies. Several organisations encouraged farmer participation in priority setting and later management decisions. The level to which this approach examined tacit knowledge held by the farmers was, however, dependent upon the context of the project. The projects that focussed on the

use of introduced tree species (e.g. FSP and BAIF) inevitably examined and utilised farmers' tacit knowledge in an indirect manner (e.g. discussing their knowledge of tree cultivation and use in general). In contrast, projects that were designed to improve cultivation and use of native species (e.g. ICRAF and ITCFSP) examined current levels of farmers' knowledge. In both these cases the externalisation process was facilitated by significant indirect involvement by network coordinators through the use of extension agents.

Incorporation and dissemination of implicit knowledge is dependent upon strong contact with end users, ability to interpret the knowledge and adapt, and possibly develop it, into explicit knowledge. Documentation of implicit knowledge on uses of neem worldwide was undertaken by the Neem Foundation in order to bridge the gap that exists in science with explicit knowledge. Discussions with NGOs, who in turn had collected the knowledge of neem uses from farmers' groups, provided a basis for compiling information that could then be distributed to other network members. The approach of networking and their organisational reach was an essential part of their ability to tap into sources of knowledge that would have been outside the scope of individual projects.

Some approaches to participatory research are reluctant to acknowledge the role of knowledge flows in the opposite direction; from scientist to farmer. However in situations where there is limited tacit knowledge on an issue, such as tree cultivation, scientists and NGOs have to develop knowledge transfer mechanisms that enable their experience to be adopted if the project is to succeed. Both BAIF and FSP have developed efficient knowledge transfer mechanisms that provide the basis for tree introduction programmes by explaining their potential uses. The level of success they encounter is determined by several factors including, the organisations' familiarity with the farmers, the needs of the farmers and their level of existing knowledge. In some cases the level of technical knowledge that is transferred is fairly high (for example in discussing the benefits in yield that can be expected with new provenances) and the incorporation of scientists' knowledge is determined largely by the level of trust that has developed between the two sides. Both organisations have found that the success of the knowledge transfer mechanism is inversely proportional to the level of existing knowledge. For example, in some instances the use of leaves of *Gliricidia sepium* for fodder was hampered by prevalent views that it had previously only been used for green manure. No such problems were encountered in communities that were unfamiliar with the tree species. This means that while there are particular challenges in working with more remote communities they are often the most successful at incorporating knowledge through the process of externalisation. The success of this process is, however, determined to some extent by the content of the knowledge that is being transferred. Contrary to the experiences of BAIF and FSP, the Green Foundation found the process of transferring explicit knowledge difficult and time consuming when dealing with highly technical subjects such as the effect on farmers of intellectual property rights and genetic modification.

In other situations it is possible that the extension agents may themselves become obstacles to knowledge transfer. As one interviewee said "We rarely work directly with farmers and we have to work hard with NGOs to make sure there is no 'message transfer' (from scientific research). This is not because we disagree with technical intervention but because we are faced with field workers who think that they are experts and farmers are very stupid and its difficult to train them when is the appropriate moment to introduce technical interventions in such a way that a farmer or user group can discuss, adapt and test things out for themselves".

Understanding how knowledge transfer occurs between different organisational levels is essential if information flow is to be effective. The limited opportunities presented within the case study assessment for meaningful direct comparison between situations meant that it was difficult to draw firm conclusions about the relative importance of links between different levels but it is a commonly held view, and one that was certainly expressed by many of the

interviewees, that the most important relationship is that formed between farmers and extension workers. At this level knowledge transfer occurs mainly through socialisation and externalisation and is highly dependent upon cultural understanding and trust. As a result it is common to use farmers themselves as agents of information transfer, as is the case with ITCFSP.

It is easy to appreciate the importance of the link between the 'promoters' and 'recipients'. Without a strong knowledge transfer mechanism between these groups it is not possible to capitalise on opportunities for research impact. Facilitation of this link is dependent upon the existing relationship between the groups and the ability to create an environment of trust. However, in order for the knowledge management system to operate successfully it is necessary for linkages at all levels to function and the focus on this link, even amongst interviewees, may distract attention from other important relationships. Rather like the links in a chain, it is perhaps not the strongest that is the most important but the weakest that determines its success. In this respect, it is particularly important to examine the links between donors and scientists and determine whether they permit inclusion of tacit knowledge held by farmers. The importance of this relationship was highlighted in one case study where the ability of scientists to incorporate farmers' views in projects aimed at improving use of trees on farms was determined by which donor was involved. In this example international and state level funding encouraged farmer inputs while national level support did not foster a link between these levels.

The proposed model of knowledge management suggests that while each of the levels of a network goes through the same learning cycle, the different roles that each level plays in overall knowledge transfer leads to a concentration of expertise and objectives on particular aspects of the process. While the basis of this assertion was confirmed by the case study assessment, it also led to a refinement of this view. Results from interviews appeared to suggest a fairly clear division between on the one hand, donors and scientists, and on the other extension agents and farmers. The former, typified by SAFORGEN, RECOFTC and International Neem Network, were concerned mainly with processing information and taking action, particularly in the form of decision-making. The latter, characterised by BAIF, FSP and the Green Foundation, focussed on experiencing, interpreting and taking action in terms of practical steps towards farmers' objectives. These results suggest the following:

- Each level within the organisational structure has a particular role and should be cautious of attempting to undertake activities outside that
- Partners should be selected who can compliment the roles of others in order to fulfil all roles in the structure

Networks that appeared most successful approached this idea by maintaining strict divisions between the roles of donor, scientist, extension agent and farmer (e.g. BAIF) while those that failed either did not understand the complexity of the whole process or attempted to do everything. An example of this was provided by one network coordinator who said that several networks failed because research themes were set up in regions without consideration of who had responsibility for actions such as collation of experimental results. Furthermore, dissemination of information was not shared efficiently amongst collaborators.

It is not suggested that all research organisations or networks should attempt to undertake each of the roles illustrated in the knowledge management model; this depends on the objectives of the project. If the project is limited in its goals then it may achieve its objectives without the need for collaboration. However, the case study analysis suggests that improving livelihoods is a complex process that requires many inputs both human and physical. Few organisations have the resources to cover all the roles and successfully manage all the knowledge transfer mechanisms required. Combining resources in a network, whether formal or informal, produced the most successful results.

In some situations knowledge flows can be compromised by protocol. Two interviewees working in regional networks in Asia reported that collaboration between scientists in Asia was hampered by the need to work through high levels of management, i.e. horizontal collaboration is difficult. This in turn made knowledge transfer difficult as the free flow of information is impeded. This type of situation suggests that the information pathways need to be studied in detail before embarking on a new research network, and it may favour the development of an individual projects rather than networks.

The concept of information flow around a network was easy for all interviewees to adopt as some were either unaware or showed little interest in the operation of the network as a whole. As such the issue of obstacles to information flow was not always understood. Those who expressed an opinion generally suggested that problems in either linking different levels or communicating within one level were usually the results of individuals rather than being related to any position in particular.

The issue of whether it is better to have centralised or decentralise networks was raised with a small number of interviewees. The responses, as with many of the comparative questions asked, tended to suggest that it depended very much on the specific situation. While there was much debate over what constituted centralisation it was generally considered that this was not an aspect of research management that clearly influenced success. Similarly, the issue of whether it is better to have distinct levels where vertical communication occurs, or no clear levels where horizontal communication occurs created no clear answer. Networks of personal relationships or creating more structured links between organisations were not seen as opposites or even alternatives. Instead they were considered to be components of an overall system.

Knowledge management within an organisation is a complex issue encompassing the ability to understand the generation of information and knowledge at different levels, and its transfer between levels. None of the organisations involved in the case study assessment had a knowledge management strategy and it was therefore difficult to identify the complex nature of the relationships involved in several of the organisations visited. Given these limitations, however, it appeared that a lack of appreciation of the different types of knowledge (particularly tacit knowledge held by farmers) could be limiting the development of appropriate objectives.

Personal relationships and key individuals

Several interviewees referred to the importance of key individuals in the process information flow and network management. Two groups of key individuals were identified: 'change drivers' and good collaborators. In the case of the former, certain individuals appeared to be the lynchpins to either organisational success or scientific energy. These individuals appeared to have the ability to develop the direction of action either through strength of personality or their own contacts and were generally seen as the driving force behind research activities. The second type of key individual was seen as someone who was a reliable collaborator even though they may have had little influence outside their narrow area of expertise. In these instances research success was considered to be determined by a network of 'good collaborators' rather than any particular mix of organisations. One interviewee suggested that "The best networks are those based on personal contacts rather than institutional ones. Individuals should be chosen on their ability to contribute rather than their affiliation to a particular organisation". This view was echoed by other interviewees and appeared to have much to do with a general view that too many networks carry partners that do not contribute. Although it was a popular idea, the type of network that focuses on individuals rather than institutions did not appear to exist and even if it did would probably run the risk of becoming too self-regulatory. However, the general recognition of the importance of key individuals and personal relationships within the network confirms the need to invest

effort at an early stage in determining how patterns are likely to collaborate and transfer knowledge.

Organisational learning

One of the key determinants for a donor deciding between pursuing research by networks or individual projects is the objective of the coordinating agency in terms of organisational learning. In other words, whether or not a principal objective is institutional strengthening through knowledge management. If it is then it may be a strong reason to support individual projects that involve the institution in question. Networks are by definition less centralised and often more focussed on diffusion, therefore the need for individual organisational learning may be reduced.

Developmental stage of the project

The model outlining developmental stages of a research network (Figure 5, section 2.5) was designed to provide guidance to planners in terms of how the networks change over time and the resources that are required to optimise their performance. The model highlights issues related to the development of projects in the following four key areas:

1. The developmental phases of a network
2. The degree of centralisation of the work
3. The skills required at each stage
4. Key points of change that determine movement into the next developmental phase

The objectives of employing the model in case study analysis were to test both its usefulness and to highlight any modifications that might be required in order to improve its value.

The idea that networks are not static in terms of their processes was mentioned by two interviewees. One said “The issues that networks are dealing with are changing. This means that the type of collaboration that is required may change”, while another suggested that networks were a stage within a much larger scheme of organisational development that had no clear conclusion. The idea that networks had an unclear developmental structure was mentioned by many interviewees and later echoed in the project workshop (see Chapter 4). In both the case study assessment and the project workshop there was considerable concern expressed amongst many practitioners that there was no clear plan of where their network was heading. Section 2.5 suggests that networks have a developmental structure that can be described and this issue was discussed with interviewees. The developmental structure was proposed in the hope that it could suggest the likely path of development of a network and the factors necessary to assist that evolution. This concept appeared new to all interviewees and in spite of their concerns over the need for network planning there was a fair degree of scepticism expressed that networks followed such an apparently rigid structure.

In order to assess whether the model was working an attempt was made to categorise the networks in the case studies according to the developmental stages of creative, formulation, establishment, progressive and concluding. Due to the nature of the case study analysis it was not possible to identify networks that were in their creative or pre-establishment phase as they were not operational. The same situation occurred with those that were finishing and therefore in their concluding phase. The networks involved in the study therefore fell into the categories from the initial stages of operation to networks that were mature.

In order to answer the question of whether or not the model was working the following areas were examined: the developmental phases, the degree of centralisation and the key points of change.

Developmental phases

In general there was agreement amongst interviewees about the idea that networks developed throughout their lives, but no interviewee had considered the idea of a model that might describe this process. When presented with the model there was a general initial view that it was too rigid. However, when the concept of the stages was discussed in more detail and interviewees had a chance to identify their own networks and processes views changed.

There was universal agreement that networks need some level of inspiration or pressure to get them initiated. This was seen as coming from one of two directions: either purely donor driven or a combination of scientists and/or NGOs and donors. There were no instances of farmers initiating either networks or the ideas that then led to networks. The term 'creative' to describe this stage of a network's development was proposed as it seemed to capture the concept of a new idea that might then stimulate a new research process. In practice, however, the networks in the case study analysis did not arise from an informal association of individuals creating a new idea. Far from it. In fact, each of them arose from clearly defined issues that had been identified in earlier research. As such the initiation of the network could be seen as logical stepwise progression of a much larger research process. This not only suggested a lack of user-led research proposals but also a lack of *potential* for the establishment of user-led research networks.

The suggestion of lack of participation in establishing research objectives and proposals is hardly new and is a constant criticism of many programmes but is it interesting to look at whether this is in fact a problem. In several cases the establishment of networks was based on a need for tacit knowledge held by users to be turned into explicit knowledge for use by the scientific and development communities (e.g. Neem Foundation, the Green Foundation, ITCFSP) and as such the 'creative' stage, or the need for the network, could not have been user-driven. In others it was the converse, i.e. a perceived need by scientists to encourage the development of explicit knowledge into tacit knowledge by farmers (e.g. BAIF, FSP, and RECOFTC). In others, e.g. SAFORGEN, EUFORGEN and the International Neem Network, the end users of the information were largely the same group as those carrying out the research. All of this tends to suggest that the term 'creative' is not an entirely accurate means of describing the preparatory stages of a forestry research network. It would be better to consider it to be non-participatory (at least in terms of farmers) and formulaic, as befits much donor funded contract research. In this respect this early stage would be better described as 'preparatory'. The main skill required at this stage was suggested as being creative but perhaps it would be better to consider it as the ability to identify potential researchable constraints from previously-funded programmes.

The next phase in network development was proposed as being one where the creative ideas of the previous stage were moulded into a programme that could then be taken to donors for funding. The proposed necessity of management skills of leadership and planning was seen as an indication that ideas needed to become formalised, possibly through the involvement of people other than those who thought of the original idea. This is perhaps where the approaches to network initiation in business and developmental science show most divergence. In business it would appear that many companies are now placing a greater emphasis than before on creativity to such an extent that ideas generation is an integral part of overall management strategy. It is perhaps interesting to note that in the outwardly more egalitarian world of developmental science there is less emphasis placed on participatory approaches to ideas generation, whether at the end user or scientist level. Many research programmes are heavily controlled by a management structure that does not encourage approaches by either individuals or groups from different management levels.

The outcome of this is, as already pointed out, a situation whereby network initiation is much more pre-determined than in many large business organisations. As such the 'formulation' stage, rather like the previous 'creative' stage is not easily transferred from a business model to developmental science.

The essence of this stage, as proposed by Greiner (1998) was to take initial creative ideas and formulate them into something that could be understood and utilised by the organisation. However, the heavy influence of senior management in premeditated and rigid research prioritization means that there is perhaps less flexibility for creativity in developmental networks and therefore little need for such stages. As such, the modification of the proposed 'creative' stage could extend to the 'formulation' stage, with the two joining together. Such a phase could be seen as combining the interpretation of fairly clear pre-determined research objectives with the determination of the potential structure and collaborators. Referring back to the model, the management skill of planning would still be a key requirement, but leadership would not be so necessary at this stage. The necessity of access to influence could remain, although it would be necessary to interpret it as the ability of the proposer to work with the donor agency.

Once the network has passed through the preparatory stage it enters the realm of becoming initiated as a recognisable research organisation. At this stage the network structure begins to take shape and relationships between partners are initiated. On a practical level this stage is characterised by a formulation of the structures of communication and administration that will be needed to run the network. However, part of the purpose of the model is to indicate skills needed in each phase to make it run successfully. In this case the skills relate to the ability to get the network up and running successfully. The necessity of finding the right person or people to get the network running was referred to by many of the interviewees and appeared to be the most important factor along with access to funding. In one case the problems that the network ran into subsequently were seen as being directly attributable to the poor choice of coordinator.

The importance of the early stages of network development was referred to by many interviewees. Several networks (e.g. EUFORGEN, BAIF, FSP and RECOFTC) place great emphasis on communication between network partners in order to create a strong network structure. In these cases the networks consider that it is important to invest effort into the communications structure at an early stage in order to encourage later success. This is achieved through contact with farmers, scientists and NGOs at an individual level and through workshops.

The characteristics of the 'progressive' stage of network development were seen as a consolidation and development of purpose and activities. The distinctive feature of this level is that the success and progress of the network is determined not solely by the original objectives but that there is a degree of feedback and development that has been allowed to become incorporated into the network. This is a logical development within any programme, whether in business in science, whereby an element of reflection and reorientation is incorporated. However, in order to assess the success of the network there has to be some degree of monitoring and evaluation, and that is sorely lacking in most networks (as discussed previously). In the case studies monitoring and evaluation was missing in project management strategies in the smaller networks regardless of funding source and management structure. Although none of the interviewees felt that assessment of network success was inappropriate or unnecessary it was only in the larger networks that action was taken to incorporate the concept into project management.

On its own monitoring and evaluation is an important part of project assessment. However, within a network it can take on an added importance due to networks' increased reach in comparison to individual projects. The relevance of monitoring and evaluation within a

network structure in comparison to individual projects is, however, only seen within the overall context of network development. In this respect, the point of fundamental importance is whether the network is seen as having a definite final point or whether it has a more fluid structure that can be determined by the more complex interactions and experiences that a network can create than is unusually the case within individual projects. As such, the importance of this stage in the developmental process can only really be assessed when considered as part of the overall development process of a network.

The final stage in the network development model is the 'concluding' phase. It was proposed that this phase represented the synthesis of network outputs and development of research plans for the future. However, the concept of a linear development of networks throughout all stages of a network's life was questioned by almost all interviewees (and later in the project workshop – see Chapter 4). There was a general feeling expressed that either the future of a network was pre-determined and, as such, there was no scope for doing anything other than concluding the research, or that the effects of the previous stage of monitoring and evaluation created a new cycle of research.

Degree of centralisation

The level of centralisation is an indication of the level of participation in management and decision-making that is evident in the network. The model suggests a progression of centralisation from a situation where a small number of individuals, usually at higher levels of management, control the early stages of network initiation and development. It was hypothesised that as the network progressed so did the level of participation of stakeholders in decision-making and management and that this was likely to better achieve research goals, partly through a more accurate process of determining research objectives but also through initiation of effective uptake pathways.

While stakeholder participation might be an overall objective of the donor or coordinating research organisation its relevance in this situation is more as a reflection of the ability of flexibility within the network. If networks are able to incorporate views of different levels of participants then they are more likely to be able to adapt to relevant situations thereby becoming more effective in meeting research objectives. Networks, by nature of their reach, tend to have the potential to incorporate stakeholder views more effectively than individual projects. While it could be argued that the level of participation is not linked in a deterministic manner to the level of centralisation of management (i.e. it is possible to have a highly centralised network that is participatory) it is true to say that participatory structures carry with them the ability to influence (if not make) decisions and are therefore a good indication of the level of centralisation present in the network.

In small organisations such as the Green Foundation and the Neem Foundation the management structure is based around a high degree of participation. This approach of coordinating a network where there is a high level of collaboration and interaction not only enables them to maintain high levels of enthusiasm of participants but also reduces operating costs. In many cases this is the only means by which small NGOs can maintain their operations. In such organisations the level of centralisation of management tends to stay constant.

In some of the larger networks such as SAFORGEN, EUFORGEN and the International Neem Network the level of centralisation of decision making is also fairly high and constant. While this approach was consistent with network objectives it did not necessarily indicate the most effective manner to achieve success. In fact, it could be argued that in more than one case examined the high degree of centralisation of decision-making and management was a result of a lack of consideration of the benefits of greater participation and inputs from other levels, or potential levels, or stakeholders.

Most networks, however, illustrated a variety of levels of participation and devolvement of decision-making. A highly participatory research structure such as that which theoretically operates with ICRAF's AFRENAs may involve several levels of participation and decision making including donor, overall coordinator (ASARECA), project coordinator (ICRAF), extension agent (local NGO) and farmer. This approach also operates with ITCFSP, BAIF and FSP, each of whom has constructed information pathways that allow participation at different levels. In each case the move to increased decentralisation is indicative of project objectives that are designed to support self-sufficiency (in each case nursery development and tree distribution). In addition, it is noteworthy that in each case the final stages of network interaction consist of preparation for self-sufficiency of the participants. For example, ICRAF's networking approach to support tree growing initiatives in SE Asia (not covered in the case studies but previously assessed by the author), and parts of FSP's programmes devote considerable effort to supporting marketing opportunities for participants.

The idea behind evaluating the level of centralisation in networks was that it would be part of the overall process of identifying the stage of network development. It was hoped that through assessing whether or not it is better to have centralised or decentralise networks it would be possible to determine the most effective means of information transfer. The question of whether it is better to have distinct levels where vertical communication occurs, or no clear levels where horizontal communication occurs became irrelevant as the evaluation of case studies indicated that the level of centralisation was a much more complex issue than had was illustrated in the model. Networks vary in the manner in which decisions are made and the level of participation that stakeholders have in that process. What the model illustrates is an idealised approach to research where donors and research managers gradually allow decisions on project planning, management and even evaluation to be undertaken by those who are more closely affected by research impacts. However, the wide variation in network objectives and approaches to research largely render meaningless a simple picture of increasing decentralisation over time. As such this part of the model would appear to be irrelevant.

Key points of change

One of the key principles of Greiner's assertion that networks followed an evolutionary model was that developmental stages were largely discrete and that movement to the next stage was dependent upon a major change in a particular aspect of network management (Greiner 1998). The concept that an organisation moves through a period of quiet evolution followed by a period of revolution in order to progress to the next developmental stage is undoubtedly attractive in both its simplicity and illustrative potential. However, its ability to accurately portray the development of a research network (as opposed to the business networks for which it was developed) was questioned by all interviewees who were asked to comment. Most saw it as an inappropriate attempt to over-analyse a process that was gradual and predictable. Only two people interviewed felt that there were key 'make-or-break' points that determined whether a network proceeded or finished at that point.

While it is tempting to dispense with the idea of key features that are necessary to move the network into the next phase it is worth taking a closer look. The genesis of Greiner's model was undoubtedly an attempt to categorise a collaborative working structure within a volatile environment in which roles and responsibilities of organisations and individuals were unclear. In some ways the analogies with research are limited, which accounts for the significant adaptations that were made to the model for incorporation into this study. But in other ways the basis of the model is extremely relevant if we are to consider network development to be a process that can be controlled and made more effective.

The idea of points of change, and their importance, is rooted in an aggressive business environment where each evolutionary phase in network development can be seen as a struggle for initiative by different groups within the network. Consequently, the points of

change tend to refer to crises of control between managers and network participants. While it would be wrong to look at the networks evaluated in such internally competitive terms, their progress was determined or facilitated by certain key factors occurring at particular times.

All interviewees agreed that the input of one person, or a few individuals, was the key factor in initial network development. While the importance of strong leadership was mentioned throughout the network's life it was emphasised in the early stages and cited as the reason for network establishment. The key issues of leadership were seen as being able to communicate effectively with members in a way that made them feel a sense of ownership of the research rather than simply acting as researches for someone else's big programme.

Not all interviewees agreed that there was a distinction between the establishment and evaluation phases. But the fact that the networks that appeared to be less certain about their future direction were those where evaluation of research success was not considered an integral part of on-going activities strongly suggested the need to incorporate this phase into network development. In this respect the key factor required to move forward was a willingness to evaluate progress.

The recognition of a clear concluding phase was generally accepted along with the idea that this stage may lead to the initiation of more work. In the case of the former the concluding phase was seen as the inevitable last stage of work and as such did not require any particular factor to reach it. However, the idea that the final stages of research may provide the stimulus for more work suggests a strong need for participatory input by end users. As such, the final key element required for a network to fulfil its potential is considered to be participation.

The objective of the model is to provide guidance to planners and practitioners in developing networks. It was intended that it would do this by indicating the skills and practical aspects required at each stage of the process. In addition it was hoped that the model would indicate the important points of change that determined whether the network would move forward. The relevance of the model was not wholly confirmed by the case study assessment and several issues were questioned by interviewees, and subsequently altered (Figure 8). However, the key features of the model appeared to be confirmed which suggested that the model itself could be a useful tool in planning and developing networks.

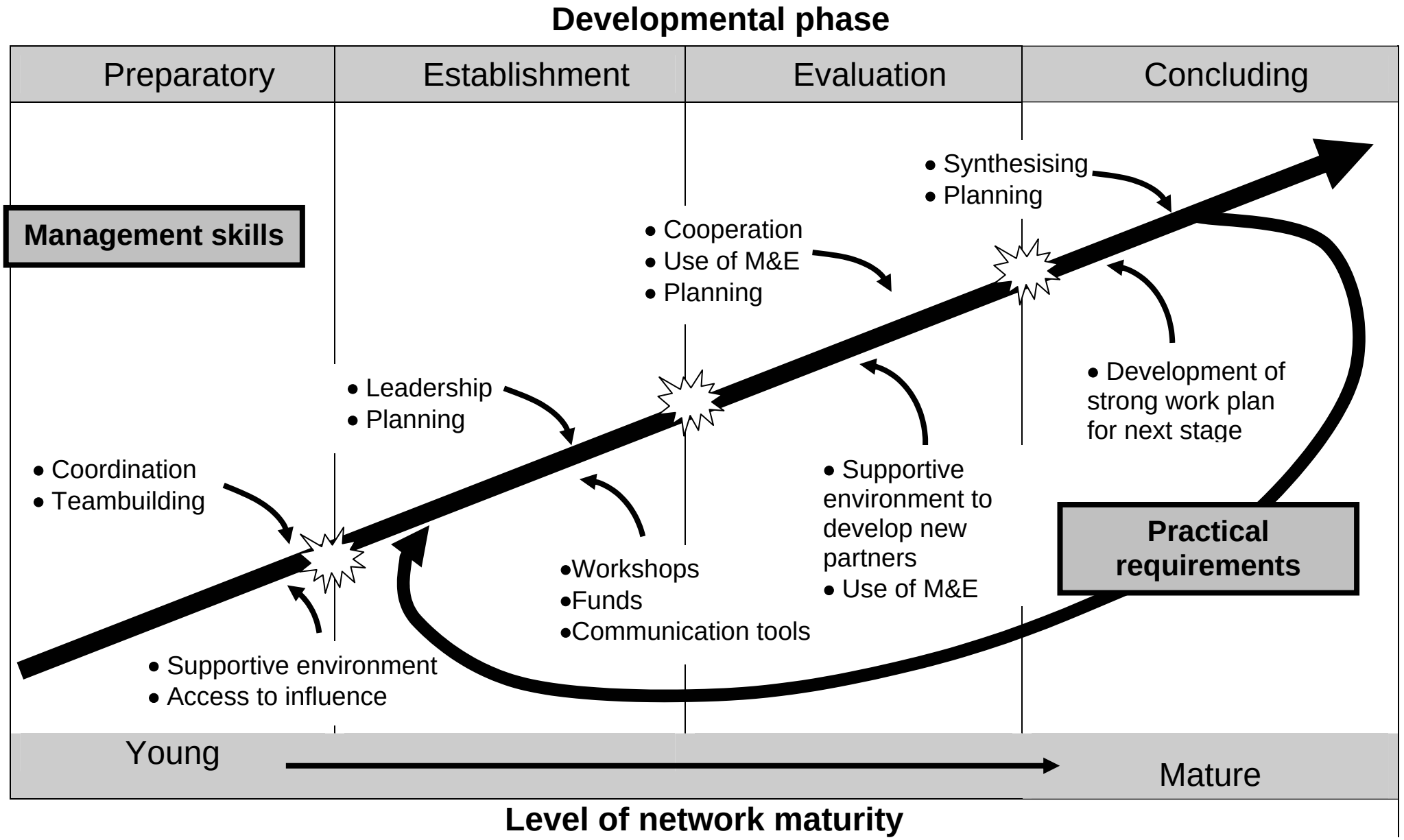


FIGURE 8 *Modified model of network development* Point of change

4. WORKSHOP

'Facilitating Support Networks in Community Forestry Development'

held at the Regional Centre for Training in Community Forestry (RECOFTC), Bangkok, Thailand, 9-12 April, 2001

Organised by CNRD and RECOFTC

4.1 Introduction

Background

Following communication between the Project Leader and staff at the Regional Centre for Training in Community Forestry (RECOFTC) in Bangkok on general networking issues it became evident there was a strong common interest in gaining a better understanding of the organisation and operation of networks. From RECOFTC's perspective the last decade has seen community forestry development networks emerge to achieve a range of objectives. Participants operating at international, national, provincial and some at more local (e.g. district) level have developed cooperative working practices within formal and informal network structures. Some networks have been initiated by donor agencies while others by one or a range of other actors. This in itself has led to a variety of network 'formats', with differences enhanced by the diversity of contexts in which they operate. With this in mind, the Project Leader and staff at RECOFTC agreed to organise a joint workshop to investigate networking issues. This chapter outlines the objectives, activities and outputs of the workshop.

RECOFTC's core activities are based around networking. The 9th Forest Trees and People Programme (FTPP) review and planning meeting on 'facilitating collaborative arrangements', coordinated by RECOFTC, identified that there are various types of community forestry support networks operating in their partner countries (i.e. Indonesia, Cambodia, Vietnam, Thailand, Philippines, India, China, Nepal, Bangladesh, and Pakistan). The discussions revealed that many of these networks face considerable problems that seriously constrain their effectiveness. It was felt that the causes of these problems and ways of dealing with them are often inadequately understood. Hence the participants in the meeting strongly recommended attempts to try to address these issues in future activities.

Information notes were sent to prospective participants (Notes 1 and 2) suggested by the Project Leader and RECOFTC in early 2001.

In order to assist both participants and organisers the Project Leader developed a questionnaire (Note6: Questionnaire A) that was sent to all prospective participants. (The Questionnaire, and its revision Questionnaire B, were also sent to various key network managers outside the group of participants to the Bangkok workshop).

It is important to note that while RECOFTC were most interested in networks related to community forestry the central issues that were dealt with at the workshop were principally related to the structural and operational aspects of network management and were therefore relatively independent of the subject of the network. As such, the apparent emphasis in the

introductory information on community forestry is largely irrelevant from this project's perspective.

Workshop objectives

Workshop objectives were stated as:

1. To improve and share understanding of major issues in community forestry support networks in Asia,
2. To identify and share strategies to address these issues in different contexts,
3. To identify priorities for collaborative action for improving network efficiency,
4. To make a plan for collaborative action.

Additional objectives identified by the Project Leader were:

1. **To assess the role of networks and networking in furthering the development of community forestry in the region.**
2. **To identify issues that assist and compromise network management.**
3. **To discuss and develop a model of network evolution.**
4. **To highlight potential improvements to network management.**

It is evident that theses two sets of objectives are complementary but the latter group is focused more on generic issues of network development.

The following questions were identified as being central to the issue of network management and operation and consequently used to determine the workshop structure.

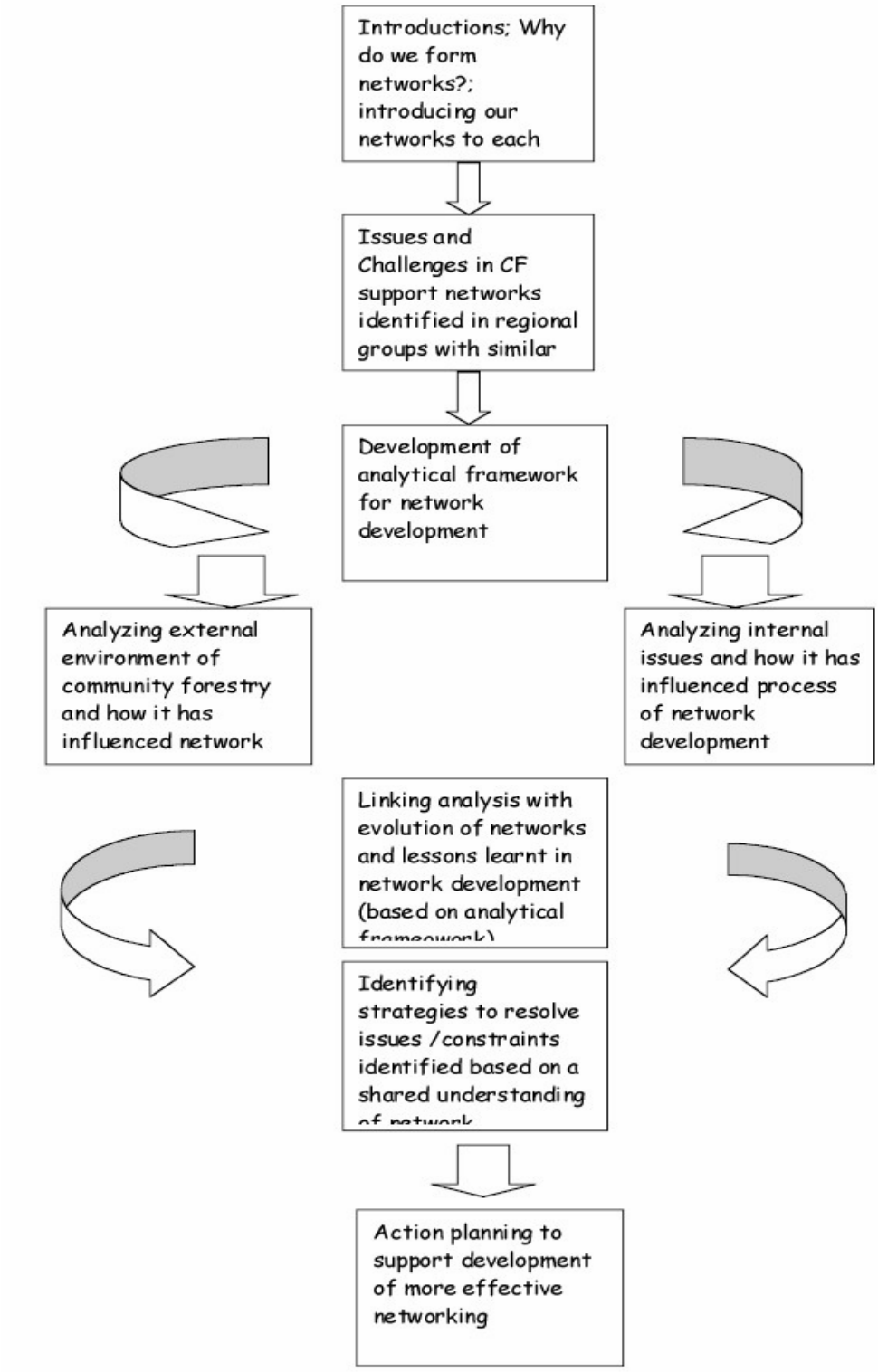
- What are some of the reasons that networks are or were formed?
- What types of networks exist and which ones are present in this workshop?
- What are the main challenges or issues that networks, and those who try to facilitate them, face?
- How can we better understand the reasons for these challenges? And: would it be useful to differentiate between issues arising from changes in the context in which we operate (our socio-political contexts) and the ones arising from the changes in function and structure in our network organization as it evolves?
- Does such enhanced understanding help us in identifying more effective strategies to deal with the key or priority issues?
- Is it possible or desirable to identify collaborative "regional" learning, sharing and support activities to assist each other in the implementation of these more effective strategies?

In order to facilitate discussions a generalized workshop flow diagram was developed (Figure 9).

Workshop participants

A list of participants is given in Appendix 1.

FIGURE 9 *Initial generalized flow diagram to describe networking*



4.2 Report on activities

General workshop structure

The workshop was designed to give a balance between thought-provoking presentations, working group tasks and plenary discussions. The workshop agenda is presented in Note 4.

The workshop was coordinated by the Project Leader, Cor Veer (Senior Programme Specialist) and Karen Edwards (Training Specialist). The introduction and final wrap-up were provided by Dr Veer. Ms Edwards gave summaries while the Project Leader gave the presentations from which working group activities emanated. All coordinators participated in working group discussions. The workshop agenda is given in Note 4. The presentations given by the Project Leader are summarised below and provided in Microsoft PowerPoint in Note 5.

The following sections comprise summaries of each session.

Session 1: Networks and networking: from ideas to impact

This session provided participants with the opportunity to explore the basic ideas surrounding the purpose and operation of networks. The questions that were asked of participants are listed below and the answers received are presented in Figures 10-15.

1. Why network?
2. What are you looking for in your network?
3. Who had the idea for the network?
4. Who is in control of the network?
5. What are the indicators of success?
6. What are the main problems?

Reasons for networking revolved around the central theme of improving capacity. Strengthening the ability of an organisation to operate was seen as the fundamental objective of networking. The approaches to capacity strengthening that were highlighted indicated the desire the share and operate as a group rather than individual organisations attempting to work in isolation. Gaining information was seen as providing a means to increase advocacy and operational potential.

The approach of strengthening capacity through networking rather than working as individuals was echoed in the response to the question of what people are looking for. Information exchange was again seen as providing potential for capacity strengthening activities.

The stimulus for networks generally came from organisations that lie outside the government sector, i.e. donors and NGOs. Interestingly, farmers were cited as a group who provided initial ideas for networks, although it was not possible to investigate their real influence in the subsequent network.

The question of who is in control of the network was designed to get the group thinking about power structures within the framework of networks. The concept of centralisation of power was introduced and formed the basis of answers. Participants were asked to consider whether control was concentrated in a small group of individuals (centralised) or in a large number of people (decentralised). Answers to this question led into a discussion on network structure (see below) and provided the basis for further discussion on information flow. The outcome was that many network structures were identified. While power was seen to be

concentrated in some and decentralised in others it was particularly interesting to note that many participants considered their networks to be more complex. In these cases power structures were seen to operate in different ways at different levels. In response to this discussion participants were asked to draw the structure that represented their network (Figure 16). These diagrams illustrated both the similarities and differences in perceptions of network structure. This exercise was designed principally to get participants to think about the idea of the structure of the network as a whole rather than simply the part in which they were involved. As such it was not intended to carry out a detailed analysis of structural elements in relation to network type or funding. Key points resulting from the diagram were:

- Some partners felt they had a very clear idea on network structure to the extent that each partner could be identified. Others were less clear to the extent that it was not possible to illustrate some interactions and possible partners.
- The level of complexity varied enormously.
- Most participants felt confident in identifying the direction of information flow and felt that the flow itself was simple (i.e. information flow is a once-only event). However, one participant illustrated a more complex model whereby major and minor information flow was operating at the same time in different directions between different levels.
- Most networks indicated information flows in different directions (i.e. both ways between participants rather than simply from a central coordinator out to participants)
- Structures showed a wide variety in terms of the existence or not a centralised power. IN some cases coordinators were seen as the central hub of activities while in others they did not exist at all. Between these two were a wide range of designs incorporating coordinators at different levels and degrees of influence. In one case the coordination was seen as rotating between partners.

The participants found that the exercise was valuable in terms of providing an opportunity to think outside their own role in a network and begin to consider how each level of decision-making and partnership could affect others. However, it became clear over the succeeding days that initial ideas of information flow tended to be simplistic.

The issue of assessment of success of the network was introduced at this stage to get the participants prepared to make contributions in an exercise towards the end of the workshop. It was interesting to witness the confusion created by the question and difficulty participants had in answering it. It was evident that personal indicators of success and network indicators were very different. In general there was an acceptance that networks were part of the job and that their existence made ones job easier through contacts and means of funding. Attempting to identify more network-oriented indicators of success became a struggle for many participants to the extent that the exercise was curtailed. Answers indicated that improving the network was seen as being the main indicator of success. Discussion of this rather circular argument was deliberately left hanging so that more thought could be given to it throughout the succeeding days.

The main problems associated with networks were identified clearly as being lack of support to activities. The complaint about lack of support was directed at government, management of the network, and the donors. In addition, it was interesting to note that the issue of lack of clarity of direction of the network was also listed by some of the participants.

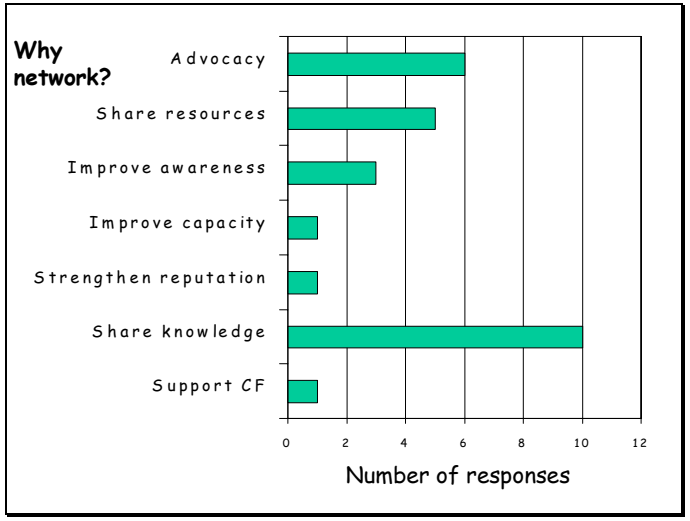


Figure 10 *Group response to question 1*

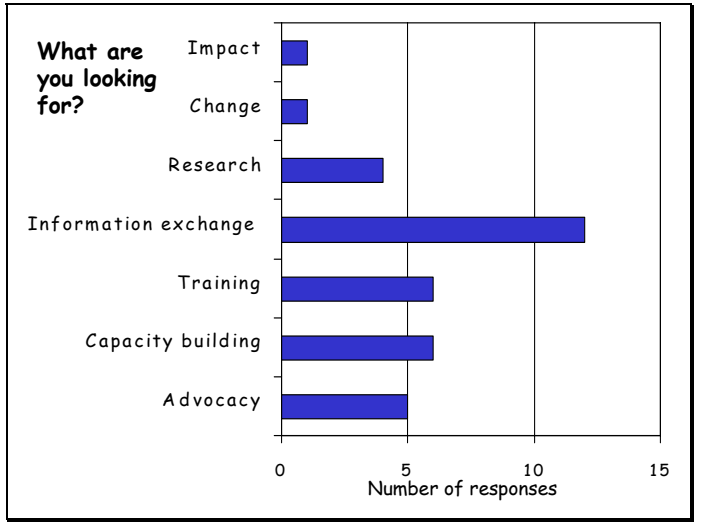


Figure 11 *Group response to question 2*

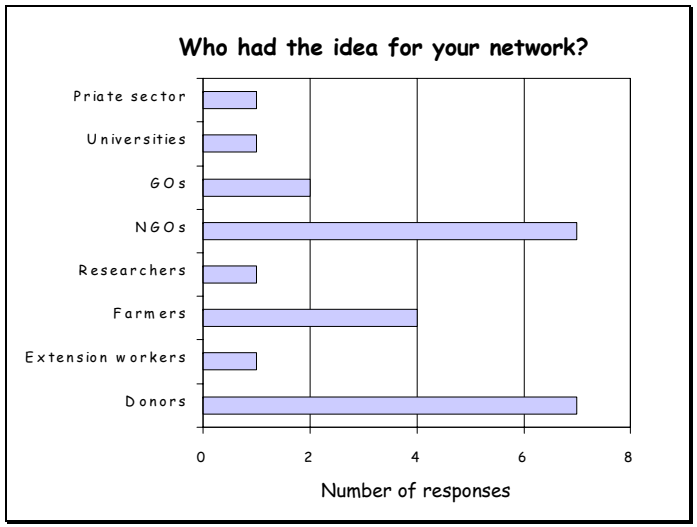


Figure 12 *Group response to question 3*

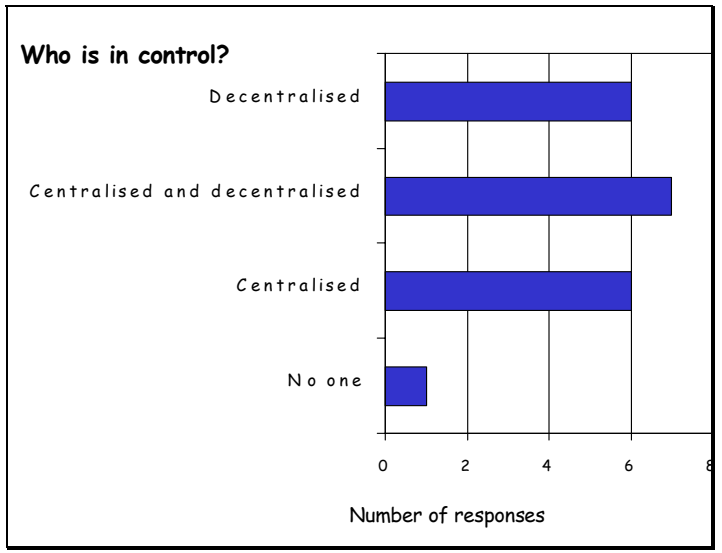


Figure 13 *Group response to question 4*

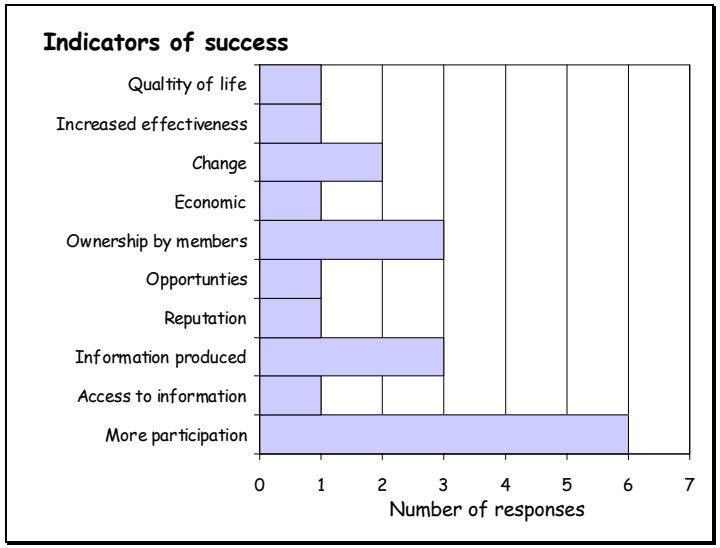


Figure 14 *Group response to question 5*

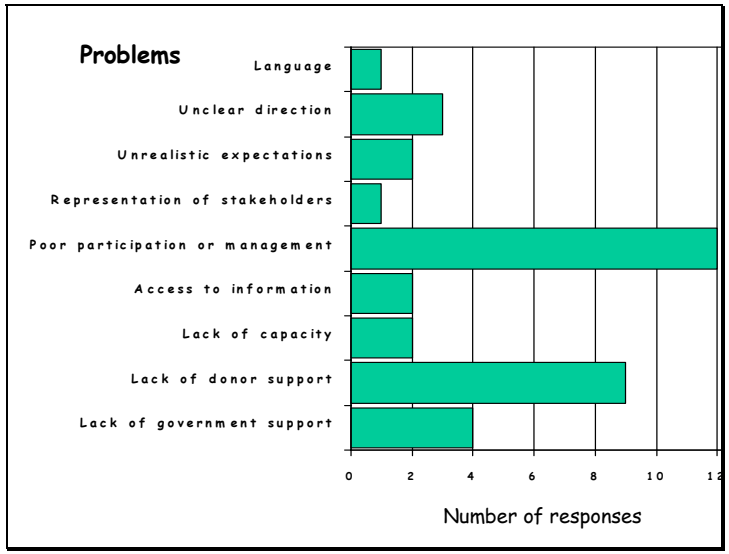


Figure 15 *Group response to question 6*

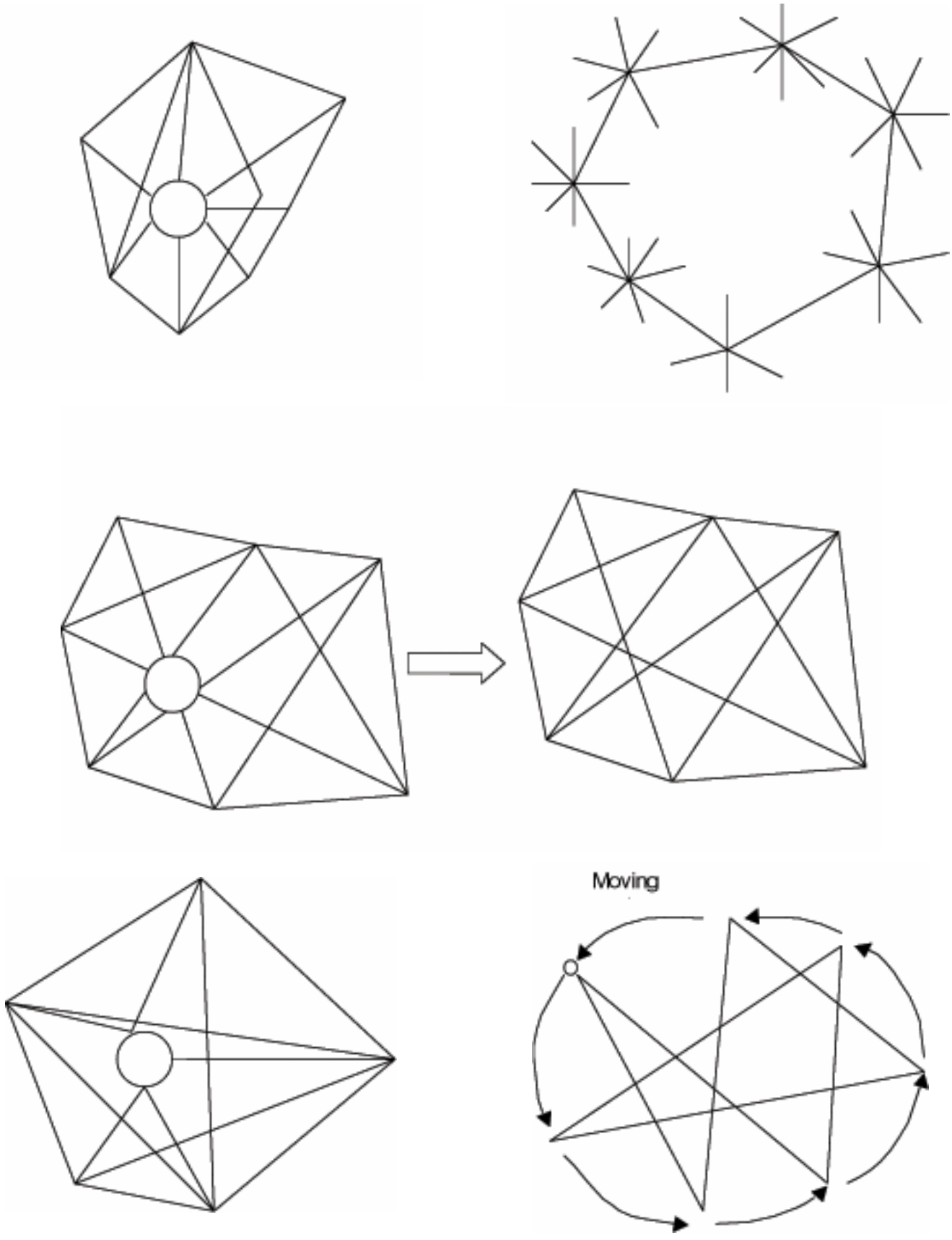


Figure 16 *Diagrammatic representations of network structure provided by workshop participants*

O = network coordinator, _____ = line of information flow

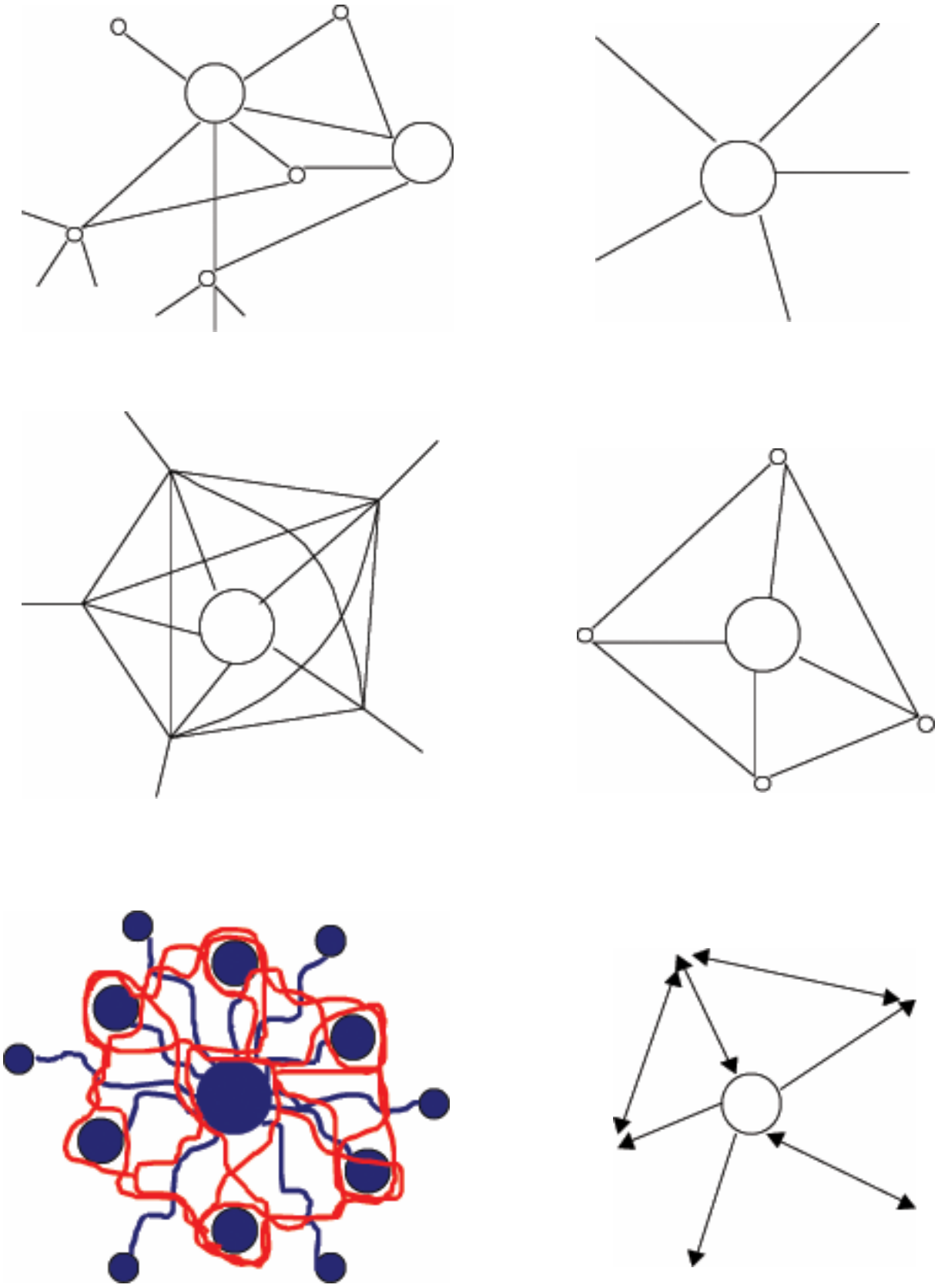
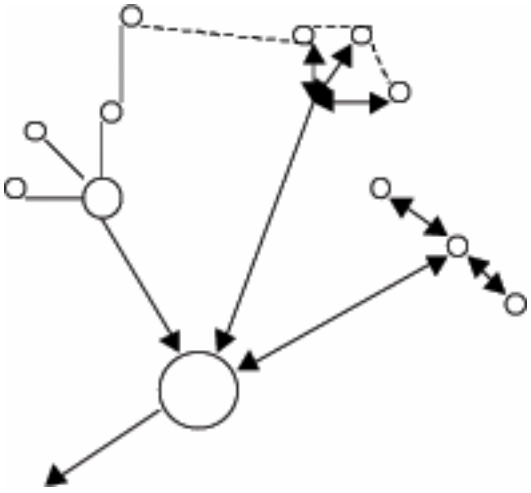
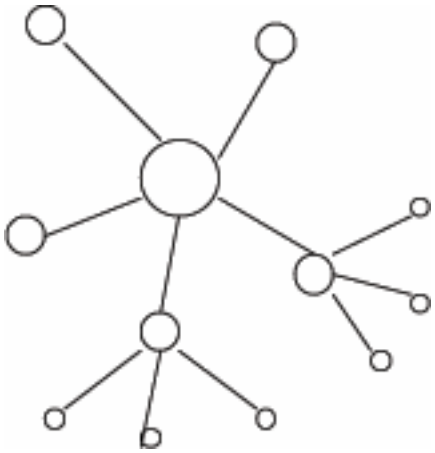
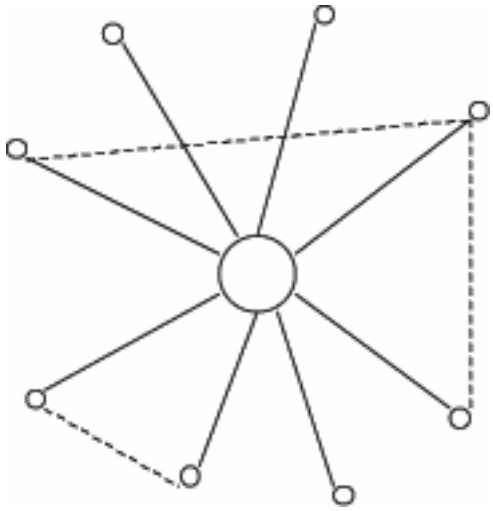
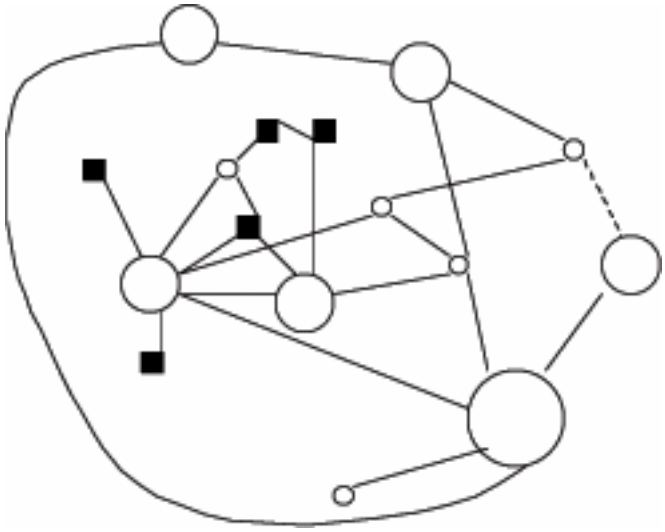


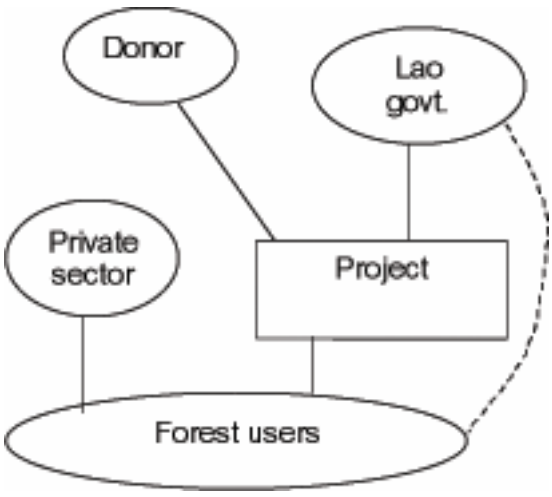
Figure 16 Cont.

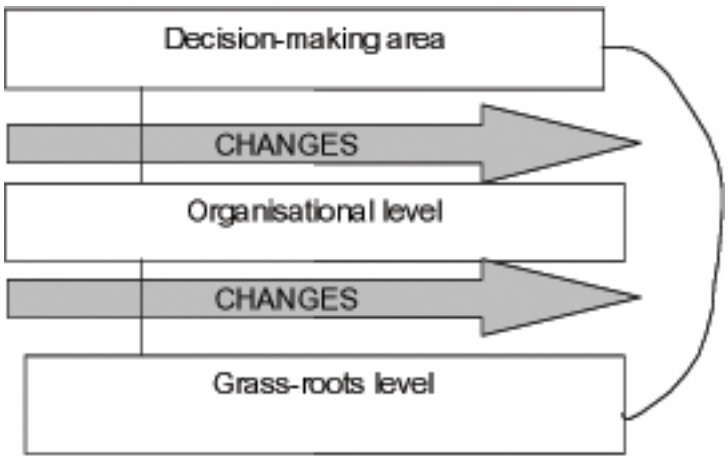












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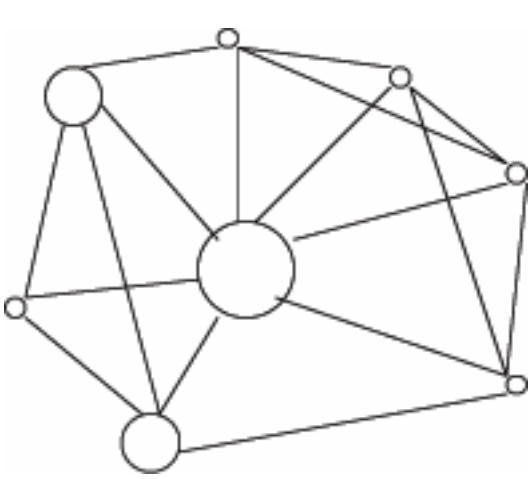
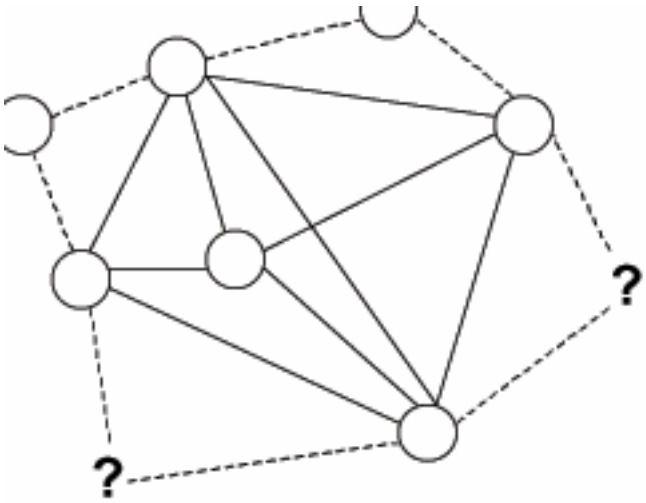
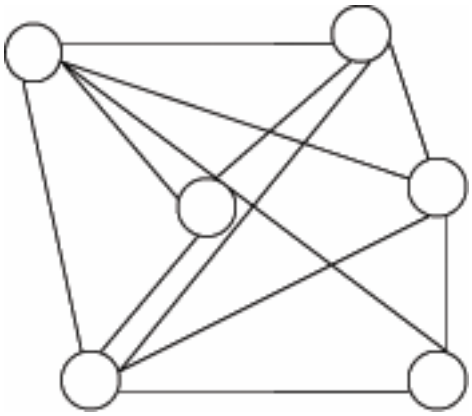






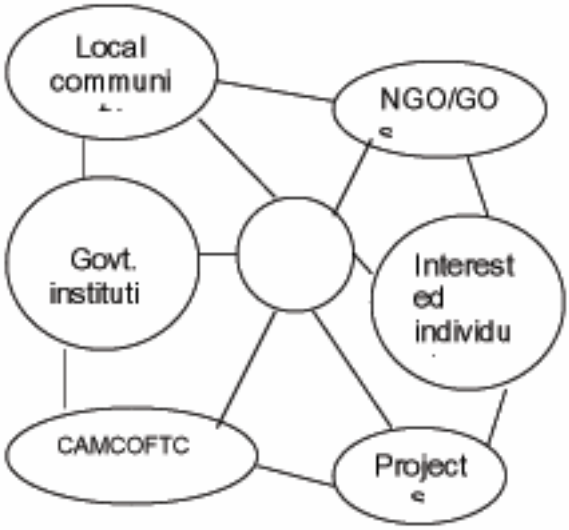


Figure 16 Cont.

Session 2: What makes networks work or fail?

Four working groups were established to identify and debate points surrounding the success and failure of networks. Groups were given freedom to decide how they structured their discussions although each group eventually required the intervention of one of the Coordinators to assist in guiding the discussion towards an output.

Results from the working groups are presented in Figure 17. The working groups provided a consistent view of the problems of network management and the approaches required to enable networks to maximise their potential. The summary of the outcome of the groups provided many useful indicators for successful network management that have been absorbed into the main report. However it is interesting at this point to note that there was a similarity in many of the points made, even though they were dealing with issues as diverse as funding, management and planning. The key themes that came out of the discussions were the need for clarity and participation. Clear objectives that encompassed stakeholders' views were highlighted along with clear management that encouraged participation. Participants wanted plans that took account of their views and allowed their feedback, and it was stated that the financial support that was required would be used better if there was a clear indication that it would be forthcoming.

FIGURE 17 *Summary of working group outputs from discussions of the issues related to the success or failure of networks.*

Key points in network success:

Objectives

- A clearly identified need by appropriate stakeholders
- Clear and shared objectives

Management and operation

- Strong and committed leadership
- Trust in leadership
- Careful choice of members
- Good coordinators (high level of management skills and experience)
- Clear and limited role of coordinators
- Participation at all levels and by all participants
  - Opportunities for meetings and feedback
  - Responsibility for network success felt by participants
- A feeling of ownership by participants
- Access to effective means of information exchange
  - Feedback from donors and coordinators
- Ability to compromise (either inherent or brokered by coordinator/facilitator)
- Adaptability

Planning

- Clear strategic plan with objectives
  - Clear mode of operations (management, meetings, reporting etc)

Financial support

- Consistent financial support
- Lack of capacity
- Adequate financial resources for operations and planning
  - Financial openness on the part of donors and coordinators

Key points in network failure:

Objectives

- Unrealistic expectations by participants (including donors)
- Too many networks attempting to do the same thing with the result that participants' efforts are diluted.
- Poor definition of objectives
- Conflict of interest with government objectives
- The emergence of new networks can damage existing networks that are carrying out similar work.
- Emphasis on 'best practices' rather than 'learning'
- Involvement of too few stakeholders based on convenience
- Driven by outside interests

Management and operation

- Leadership/coordination that takes little account of members' views
- Poor facilitation/coordination
- Lack of flexibility to change
- Too many members
- Lack of legal status of network makes it difficult for partners to join or know what are their rights
- Overly complicated objectives and management structure
- Domination of network by a few powerful or vocal participants
- Movement away from informal towards formal networks
- Heavy-handed approach by donors (they control much of the power via their funds)
- Poor mechanism for reflection
- Lack of ability to compromise (either inherent or by coordinator/facilitator)
- Organisers prolonging life of the network for their own purposes

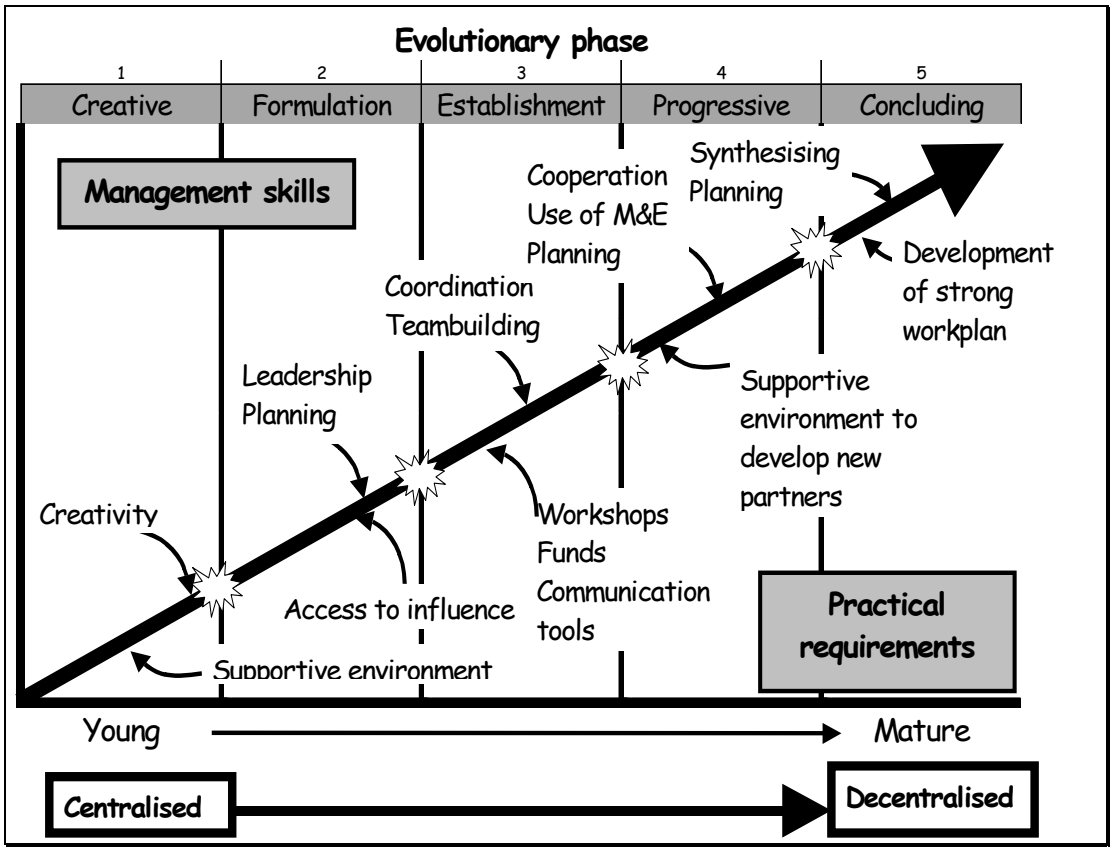
Planning

- Too much focus on initial activities with little thought for follow-up work
- Lack of membership criteria leading to flooding of network by inappropriate participants
- Unclear decision-making process
- No internal monitoring

Financial support

Session 3: Network evolution

One of the main objectives of the workshop from the perspective of R7450 was to test and develop the Project Leaders' model of network evolution used in the case study assessment (Figure 18).



Where  indicates the point of change between one phase and the next, and different phases require different key skills and have different practical requirements.

Figure 18 *Network development model*

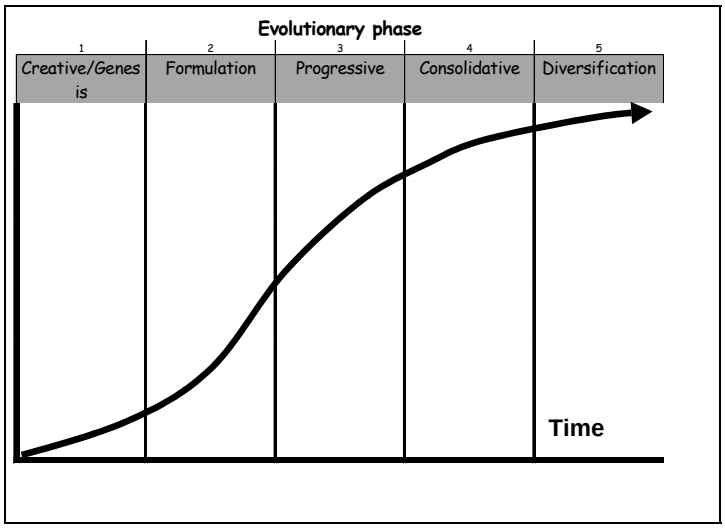
Participants were introduced to the concept of the network evolution by reference to several networks that the Project Leader has worked with, most notably the Forages for Smallholders Programme in southeast Asia. Each stage in the evolution of a network was described within the context of its operational lifetime. Following a group discussion participants were asked to discuss the following points in working groups

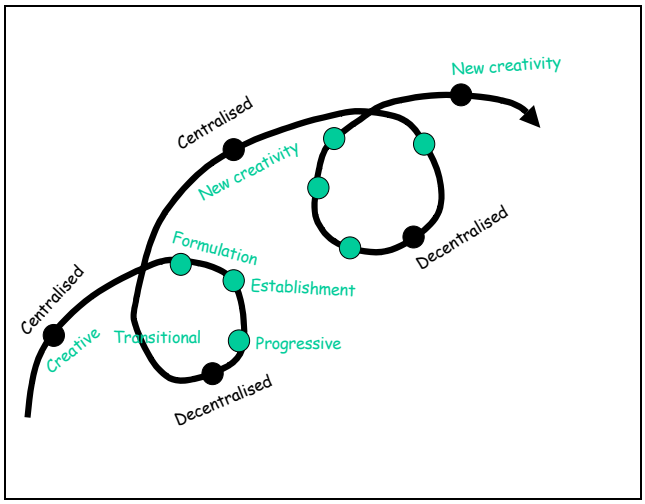
- Describe the evolution of the network
- Identify the developmental stage of the network
- Highlight the skills and tools needed to progress

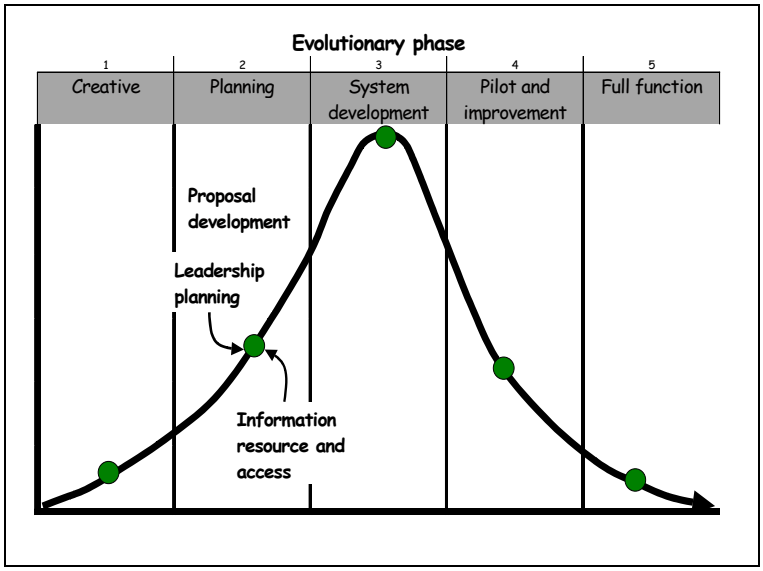
The objective of the session was both to challenge their thinking in terms of network structure and to encourage participant to think about where their network is going and what they need to assist them towards their goal.

The concept that networks might go through certain clearly identifiable stages was new to all participants and stimulated much discussion. While some individuals immediately agreed with the idea that many networks show similar characteristics in their life others disagreed initially and considered that the subject of the network tended to identify it as more or less unique. Participants spent some time identifying the different stages in their own networks and through this process a general agreement was reached about the validity of the model. However, while it was evident that their was much agreement over the general concept of network evolution and the stages that comprised the model there was nonetheless a heated debate within the working groups and significant modifications to the original designs were suggested. Three alternatives approaches to the interpretation of the model were debated and are presented in Figure19.

FIGURE 19 *Three modifications to the generalised model of network evolution suggested by the working groups*







The first modified version of the model suggested that the development of the network did not take place at an even pace. Although a curve was presented, the point being made was that each network had an individual growth curve.

The second version focused on the issue of power and decision-making. The original model suggested a progression from a centralised structure for network management towards a more decentralised means of decision-making. One of the working groups felt that this did not represent the true picture in terms of their experience. They felt, as did others in the summing-up discussion with all participants, that there are variations throughout the lifetime of a network regarding how decisions were made. Several participants spoke of a cycle of development of power and influence that varied over time. They made an important distinction between this power structure and the issue of evolutionary phases and emphasised that the two were largely independent of each other.

The third variant highlighted the management intensity that was evident at different stages of a network. It was felt that there was a general increase in the requirement for management from the initial phase towards the development of a 'system' of operation. It was then argued that the intensity subsequently dwindled as the network became more independent and moved into its operational phase.

Each of the variations to the initial model was clearly relevant to certain individuals in their interaction with networks and highlighted the need to add flexibility to the network evolution model initial proposed.

Session 4: Indicators of success

Even before this session began many of the participants voiced their concerns over what they saw as a complete absence of criteria by which to judge the success or otherwise of their networks. This session was designed to provide the opportunity to discuss the needs of different players in networks with regard to evaluation. Issues discussed included what was meant by success, the political nature of evaluation, the relationship between indicators and impact, and the problems inherent in attempting to provide criteria for evaluation that might be suitable to different parties. Working groups then discussed the criteria for evaluation and how they might be used. Groups addressed the issues in different ways and results of the discussions are presented in Table 5.

TABLE 5 *Results of working group discussions on indicators of success*

Objective of evaluation	Indicators of success	Means of achievement
Capacity building of members	Number of members	
Influencing policy	Policy changed	
Provision of training opportunities	Training undertaken	Lobbying network donors
Sharing of resources	Active resource sharing	
Achievement of collective strength	Feedback from participants	Hosting meetings and workshops
Promotion of women's participation	Increased number of women in networks	

What works	Indicators of success	Means of achievement
Shared resources	Members' feedback	Multiple donors
Active members' participation		Increased participation
Clear plan	Presence of plan	Increased funding
Coordination	Members' feedback	Agreed workplan
Lesson learning process		

Principles	Criteria	Indicators
Shared understanding	Clear objectives for all members	Members clear on objectives
		Members accept leadership of coordinator
Facilitation	Good coordinator	
		Democratic election of coordinator
Lessons learned & adaptation to external environment	Flexibility to change	?

The Working Groups found the exercise difficult largely because they felt the objectives to be too ambitious. However, they were in agreement that this was a useful process to go through, particularly at the planning stage. It was considered that this was a tool that could be used to see how realistic network objectives might be and could be employed on a frequent basis.

A key point discussed in each group was the difference in approach that might be adopted when looking at quantifiable and non-quantifiable indicators of success. Not surprisingly the participants were much more comfortable with the idea of measuring the number of participants than with assessing the impact of a change in policy. While it was not the objective of the workshop to delve too deeply into evaluation criteria it was evident almost without exception that participants were unfamiliar with either the need for impact assessment or the means to carry it out.

Although each Group decided to approach the question of evaluation criteria from different perspectives it was interesting to see the general trend in the results. Points that were emphasised in the outputs by all groups included the need for planning, participation, and sharing of information (and resources). These ideas illustrated the emphasis placed on network organisation rather than specific outputs by almost all participants. The identification of means of assessments of these objectives revealed even more agreement in the focus on network partners rather than donors.

Session 5: Strategies for success

The workshop provided the opportunity for the Project Leader to discuss with a wide range of participants the needs of network participants and how they saw their role in the overall network organisation. The different parts that participants saw themselves playing in the overall network structure clarified the distinction between the need to assess the performance of the network as a structure and the need to look at its impact. While the two are clearly linked different participants were able to show that the level of success of their participation was not necessarily linked to both. This distinction between process and impact provided the foundation for the final exercise. In this session participants were asked to build upon the outcomes of earlier sessions and identify how these could be incorporated into working practices. Table 6 indicates the general lack of management transparency felt by most participants. Problems surrounding lack of clarity of planning, and participation of interested parties in decision-making at an early level were frequently cited as the reasons for network failure. Identifying these limitations and suggestions for their solutions were not contentious. There was general agreement that increased participation was the most direct and effective means of approaching the issues.

Indicators of impact reflected the differences between community forestry and forestry research. Policy and advocacy were seen as the main tools to promote impact and, again, participation was seen as the key in terms of the indicators and tools for implementation.

TABLE 6 *Working Group summary of factors facilitating process and impact of networks*

Process			**Impact**		
What works	**Indicator**	**How?**	**What works**	**Indicator**	**How?**
Better understanding	Sharing of issues	Survey/ discussions/ meetings	Influencing policy	Involvement of policy-makers	Attendance of policy-makers at network planning meetings
Identification of objectives	List of objectives	Workshop		Communication between network members and policy makers	Feedback
Clear workplan	Workplan agreed by all partners	All partners sign agreement	Advocacy	Policy change	Evaluation workshops

4.3 Workshop outputs and outcomes

Outputs in relation to RECOFTC's objectives

RECOFTC's objectives	Level of achievement
To improve and share understanding of major issues in community forestry support networks in Asia.	***Fully achieved*** Participants were able to identify the main issued related to the structure and function of networks.
To identify and share strategies to address these issues in different contexts.	***Partially achieved*** Strategies were discussed but they were not linked to specific issues or problems.
To identify priorities for collaborative action for improving network efficiency.	***Not achieved*** Priorities for collaborative action were not identified.
To make a plan for collaborative action.	***Not achieved*** Collaboration between networks was not formalised although informal linkages made between participants may lead to stronger collaboration in the future.

Outputs in relation to the Project Leader's objectives

Project Leader's objectives	Level of achievement
To assess the role of networks and networking in furthering the development of community forestry in the region.	**Fully achieved** The role of networks compared with other options of carrying out community forestry operations was discussed (see discussion below).
To identify the issues that assist and compromise network management.	**Fully achieved** Issues that make networks work or fail were identified.
To discuss and develop a model of network evolution.	**Fully achieved** A model of network evolution was discussed and modified.
To highlight potential improvements to network management.	**Partially achieved** Strategies for success were identified and discussed but it was not possible to construct operational plans for adoption of improvements to the participant's networks.

Additional issues arising from the workshop

- Lack of focus on 'real' issues: The workshop provided a useful framework to start thinking about networks in a more structured way. However, as expressed in the evaluation (4.6.10) some participants felt that their 'real' issues were not adequately addressed. Although many of the workshops objectives were met there was not enough time to link the general ('organizational evolution') framework to the specific issues that participants experienced. It is likely that the diversity of networks that participants are involved in as well as the diversity of settings in which they operate may have been a major factor for the reported 'gap' between expectations and experiences (Edwards et al. 2001).
- Lack of agreement on what constitutes a network: Some confusion arose between the terms **networking** and **network**. It became apparent that everybody networks but debate emerged around the issue of what is it that makes us think and deal with networking as a network? Some participants suggested a network exists 'when organizational arrangements' emerge, i.e. specific roles and responsibilities, become

formally recognized. There were others who expressed increasing discomfort with this ‘formal organization’ definition of a ‘network’. Many seemed to feel that there is something ‘in between’ this network as a ‘formal organization’ and the ‘networking’ that everybody does all of the time.

Key points for network evaluation

Based on the experiences in this workshop, it is necessary to establish the following baseline information prior to developing plans for network utilisation:

☑ network functions (what is your network trying to do?)

☑ management functions (how are priorities identified, activities planned and implemented, and what sort of ‘constitutional arrangements’ are in place?)

☑ what organizational arrangements have evolved and what are the issues?

4.4 Discussion

The participants desire to operate in networks rather than as individuals or organisations working in isolation was evident throughout the workshop. At no time did any participant suggest that networks could not work or that there was an advantage to be gained from working without the interaction of partners. The principal value of networking was seen as capacity strengthening. All organisations represented wanted to increase their ability to work towards their goals and saw the sharing of resources as one of the most effective means of achieving this.

The issue of network structure was one of the most interesting outputs of the workshop. Networks are rarely assessed in terms of their organisation and structure. There is generally an assumption that they work at some level but that the exact relationship between partners is hardly ever examined. Karl (1998) is one of the only authors to attempt to define network structures yet she suggests only a few basic models. The participants indicated that there are as many different structures as there are networks. There were, however, certain themes that repeated themselves in several of the participant's designs. The most common was the presence of a central coordinator surrounded by partners. However, rather than the 'bicycle spokes' design commonly attributed to networks the structures illustrated by the participants indicated a strong tendency towards greater complexity in the relationships. Coordinators were depicted at different levels and differing degrees of importance. In addition, several participants saw an evolution in their designs from centralisation towards greater participation amongst partners.

The importance of understanding network structure lies in the development of operational relationships. Networks are usually established with little thought given to either the structure or, particularly, the development of that structure over time. Unfortunately time did not permit a detailed analysis of the details of each structure in order to draw conclusions about the most successful elements in relation objectives.

The linchpins of network operation were seen as being clarity of management, and participation. While these are perhaps not surprising outcomes they are worth highlighting if only for the reason that they are so rarely taken given a high priority in either network planning or management.

Network evolution was a new concept to the participants. While some resisted the idea at first others immediately embraced the concept of the model that was presented. The idea that networks might move through defined stages was one that most participants accepted, and the manner in which they were able to adapt the original model towards their own situations provided one of the most valuable outputs of the workshop. Some of the participants felt that the model was too rigid in its depiction of network activity and the development of ideas of growth curves and oscillating degrees of management intensity provided valuable inputs into the modification of the model.

It was interesting to note the difficulty with which participants tackled the issue of measuring the success of networks. Most, if not all, participants considered the continuation of the network to be the principal means of assessing achievements. Few had thought about the need to look at the impact of their work and none had any mechanism by which to measure it. However, there was agreement that this was an essential part of the overall management of networks. Several participants said that this was the most important output of the workshop even though it was not possible to encompass a detailed assessment of impact indicators.

4.5 Conclusions

The workshop provided a valuable opportunity for a group of individuals working for a diverse range of organisations to discuss the common theme of networking. There was a striking level of similarity amongst participants regarding the challenges they were facing in terms of understanding network structure and the need to improve operational practices.

In such a short time together it was not possible to provide detailed analysis of individual networks, but there was undoubtedly an increased awareness of opportunities to improve participation in planning and management by network members. In addition, participants gained a more thorough understanding of the need for impact assessment and the benefits that can be gained from taking a more holistic view of network management.

5. DISCUSSION

5.1 Deciding between networks and individual projects

The objective of the study was to determine approaches that would help decide which research should be carried out by networks and which by individual projects. Although results from case study analysis, key informant interviews and reference to literature indicate that It remains beyond the scope of current approaches to construct a quantitative evaluation method that can compare the differences between project-based and network-based research investments the study suggests that there are indicators that might help to determine the type of research systems that should be applied in different situations. Assessment of the strengths and limitations of different approaches towards forestry research have revealed key areas that can not only help define the most appropriate approach to research organisations but also indicate key areas that need to be examined in order to improve overall research efficiency.

However, a constant theme in this report is whether or not the debate between networks and SAPs a genuine one. In many cases there appears to be a rush to create new networks based on an assumption of independence between national and transnational research capacity. For example, Soderbaum (1999) argues that the excessive focus of national research capacity is badly misguided and ignores the structural shortcomings of most national systems as well as the role that properly designed networks can play in research capacity building and knowledge production. He concludes that networks of various types form integral parts of more or less all successful research activities in the world today, and there are few, if any, examples of progressive research without some type of informal and formal research network and networking. Galloway (2000) agrees that with increasing decentralisation of functions carried out by the state there is increasing impetus and support for establishing collaborative approaches to many research activities in general.

Choosing between networks and individual projects

Although it can be true that collaboration and a broader inclusion of partners can bring about much greater impacts, it can also become a convenient excuse for establishing networks without considering the alternatives. Networks tend to be big and try to address all problems at once, while smaller, more focussed or localised projects can also have important effects. After due consideration, the network alternative might still emerge as the right way to proceed, but there must be a recognition that it is not the only way to proceed.

In some cases selecting between networks and individual projects to pursue research agendas may be pre-determined by limitations or objective. For example where projects are relevant for particular countries and require special local knowledge or facilities for research. In other cases objectives may be common to eco-regions or ecosystems which span several countries, for which a regional approach through networked research groups may be more efficient and effective. This is particularly relevant where national research users are often constrained by lack of expertise and resources, and networks can help overcome these limitations. Making this potential a reality requires a clear understanding of the role of networks and consortia, as well as their potential strengths and limitations. In other cases ‘networks may be favoured as a means of implementing the regional strategies of donors (for example with IPGRI’s activities (Gass and Laliberté 1996).

Sometimes the distinction between networks and individual projects is difficult to determine as they merge into each other. Cases where members do not collaborate at the same level or with the same interest can lead to the establishment of ill-defined “strategic alliances” between partners. These can take the form of formal or more informal structures, such as those highlighted by Barr 2000b in Ghana. She found that bilateral communication is often

preferred to formal networks, even when it part of a larger networking system, as it is seen as being more direct and easier for the participants to manage. In this regard, the 'critical mass' referred to earlier that is required to transfer individual learning into organisational experience should not be seen simply as a number of people. It is more useful to consider that the goal should be to develop an institutional structure that allows organisational learning. This can happen within a structure that favours networking or supports individual projects. The only apparent advantage of individual projects in this regard is that organisational learning may be more straightforward because in networks there is often no central organisation to handle information.

The complexity and variation in the uptake process is highlighted by Sechrest et al. (1998). They consider that the type of intermediaries, the adoption process and the innovations concerned all combine to create a myriad of scenarios from which no clear favoured research structure emerges to support impact delivery. One of the main issues is that intermediaries in the uptake process are diverse. This diversity is amplified by the different kinds of relationships that they have with end users, who themselves vary from peasant farmers to sophisticated agriculturalists. Adoption is therefore a complex, multi-level process. Sechrest et al. (1998) state that while straightforward technologies, like the adoption of a disease resistant line of a specific crop, have simple adoption pathways most "innovations" have much more complex adoption pathways and "need accounting for at different levels and from the perspectives of multiple organisations and actors". Finally, innovations do not necessarily come neatly packaged and ready to use in the field. They often require adaptation and adjustment, field testing and correction before they can be expected to be adopted on a widespread basis" . A good example of this is provided by observing FSP's approach to adoption of tree legumes where they employ an iterative process incorporating a strong feedback mechanism before promoting a particular species or provenance. This highlights the point made in the project workshop that although there should be a seamless transition between farmer and scientist a more important issues is the development of a system whereby feedback from the end users back to scientists occurs. Without such a system a project runs the risk of promoting inappropriate outputs and eventually becoming redundant.

Why network?

The study has revealed that while networks and strategic alliances form an integral part of business and industry, and are playing an increasingly important role in agricultural research they are less widely used, and less well understood, in forestry research. The historical basis of forestry research networks as a means to foster the exchange of information amongst scientists has developed only gradually to embrace the benefits of collaborative research. However, with increased interest in participatory research and the development of increasing collaboration between different levels in a research structure has come recognition of the increased difficulties encountered with more complex systems involving collaboration.

In the most valuable analysis of forestry research networks to date Nair and Dykstra (1998) concluded that international networks that actually conduct collaborative research are rare in forestry and that most existing forestry research networks concentrate primarily on information exchange. This was a surprising result and not one that is borne out by this study. While the number of networks that have the words forestry and research in their title may be few there are many examples of forestry research being conducted within a network structure, albeit frequently as part of a larger agricultural or natural resources initiative. This increases the importance of understanding the complexities associated with the dynamics of the networking process.

The study has indicated that the benefits of networking, both quantifiable and unquantifiable, do not happen on their own. They are heavily dependent upon the existence and development of an enabling community that fosters participation and innovation. While the process of informal networking in forestry may be common, the development of these key factors is not. Networks enable the accelerated development of new knowledge mainly through establishment of knowledge transfer pathways that cannot be created in individual projects. The process of networking helps move information through an array of institutions and adjacent networks and enables lessons learned to be translated quickly. It can promote cross-fertilization, a spilling-over of ideas across sites and sectors, and create ways of addressing them. In other words, networks provide a structure for communication.

These knowledge transfer pathways are as important for donors and scientists as they are for end users. The sources of information available to policy makers, whether they are formal or informal, tend to be limited and characterised by quantifiable indicators that are published in formal literature. The long time delay between information generation and absorption into knowledge is compromised further by the inaccessibility, and frequently the incomprehensibility, of such information to impact facilitators such as NGOs and extension agencies. All of these sources are limited in both scope and content. If we are really looking to encourage 'innovation' or new thinking or, more realistically, an effective means of transferring knowledge then networks provide the best approach. Channels are created and barriers are lifted and communication is enhanced.

Networks are, however, unusual structures. They break the mould of traditional approaches to information transfer and KM in that they can, at their best, create a more open structure where information can flow freely within and, most importantly, between levels. They also permit information to be turned into knowledge more easily through debate and they work within an environment which, at its best, can foster innovation. With correct management and a genuine desire to work towards common goals they can be an effective means of carrying out research.

Networks also operate in a totally different environment from individual projects in that they are often outside main organisational research agendas, funded from outside sources and thereby create an environment where, as Bernard (1995) puts it there is "a greater margin for experimentation and risk-taking". A network can provide the weight of numbers and range of perspectives necessary to produce a louder voice in the policy forum – thus creating a capacity to work in constructive ways and on a more equal footing with existing power structures.

Although the concept of networking may appear attractive to participants it is important to evaluate their motivation for joining collaborative research and discover if they consider there are options. Results from the case study evaluation indicate that networks are often valued more for their ability to provide access to information about new technologies, career development opportunities and access to funds than because they provide a basis for collective action. This is in agreement with the findings of Barr 2000c, who discovered that where functions can be performed whether collectively of through bilateral interactions, the latter is often preferred because knowledge pathways are either already in existence or are easier to establish than through the formalised structure of a network. So, while networks can provide a basis for collective action, they are often not embraced by potential target groups. One of the challenges of collaborative research is therefore to reduce the perception of networks as burdensome instruments that hinder rather than assist knowledge management.

It is also important that the limitations of networks are recognised and that too much is not expected from them. The lack of understanding of network structure and function has undoubtedly led some donors to have unrealistic expectations of what might be achieved.

This may in turn put pressure on developing country institutions to network beyond their means by investing time and money that is already in short supply.

5.2 Key points in improving network performance

Obstacles to collaborative research

Both the need and the desire of individuals and organisations to collaborate in research projects were constantly reflected in the study. Individuals at all levels of organisational structures generally have strong perceptions of the potential and actual benefits of networking. In many cases these views are uninformed and based more on an ideal vision of how individuals could collaborate than on direct experience of the complexities of networks. Nonetheless the study revealed that the principal objectives of collaborative research from the perspective of the different participants were clearly defined as follows:

- Knowledge creation
- Knowledge exchange
- Creating increased cohesiveness amongst partners (often referred to as 'networking')
- Capacity building

It was interesting to note in the literature review that most scientific studies appeared content to highlight the benefits of networks. Relatively few drew attention to the potential problems, and fewer still questioned how to address such obstacles to networking. Consequently, as was the case with much of the study, it was necessary to refer to experiences from business to gain an insight into the networking structure. Möller and Halinen (1999) evaluated what they termed the "nonruled" character of complex network relationships, and concluded that even in the more advanced business world there is still much to be done in developing good managerial guidelines on the basis of the already existing network research and theory.

One of the main problems with promoting networking to achieve research goals is that networks are often managed in a very loose manner leading to a lack of control over what is happening inside them. The general a lack of understanding of the need to consider network dynamics as a distinct management system frequently leads to poor monitoring and evaluation and a perceived lack of impact. In addition, an assumption that goodwill and common objectives will form an appropriate research structure all contribute to a system that can prove risky for donors, members and the wider environment. Ironically, several authors and interviewees pointed out that it is in regions in which it is most critical to have well-run networks (for example, Africa) are often the very ones where irregular and erratic communications, weak institutions and limited human and infrastructure resources make the problems of networking most intractable.

Poor management can contribute to the perception that networks are an expensive way to carry out research, especially at the front end, making any network which does not last beyond 2-3 years especially wasteful. Often to the frustration of donors and members who want quick results and clear impacts, networks need time to establish links with policy makers and gain some level of credibility. Pressures put on networks to show concrete products and progress in the short-term, and decisions to withdraw support quickly where they don't, risk undermining the very capacity and impact for which they aim.

Heavy donor influence in policy decisions relating to selection of work in certain sectors and research environments is another problem in developing network management principles. Where very large resources go to a few actors or to topics selected as "key" they can be exclusive at the expense of those people and sectors deemed marginal. In this respect it is

essential that donors initiate network planning with knowledge analysis and stakeholder input into research priorities. Part of this process also involves understanding the broader research environment so that networks do not upset the balance of existing research programmes but complement their activities. A crucial part of the research planning process is therefore to develop an understanding of the relationship between local, national, regional and international research agendas and capabilities. Links between farmers and research projects that have taken time to establish can become disrupted and bypassed if new, well-funded, research initiatives divert resources. Options to establish new networks, networks within networks, and individual projects need to be considered *before* any action is taken.

In many cases the major limitation to collaborative research is the lack of existing networking skills. A shortage of fundamental management skills such as how to organise meetings, how to facilitate meetings, how to record findings and how to organise follow-up meetings were reported amongst the case studies as disincentives for the development of collaborative research. In addition, the lack of ability to promote a teamworking ethic amongst collaborators can be a reason for network stagnation or failure. In this respect it is essential to instil in participants that networks rely on participants acknowledging that individual and collective responsibility are not opposites.

Another risk with networks is that the managerial distance between policy makers and farmers generally means that there is little opportunity for new ideas, innovation, and different (non-traditional) approaches to problem solving. Several interviewees reported that donors had lost contact with national or local agendas. An outcome of this situation is that it is possible that lack of communication with policy makers can mean that network coordinators and facilitators act with little authority (Galloway 2000). The need to identify ways to bridge this gap was highlighted by Swann et al. (1999) who concluded that networks which foster communication are more likely to enable tacit knowledge transfer and thereby innovation.

An added complication to network management is the variation in cultural means of decision making. RECOFTC (2000) indicated that one of the main problems of creating and maintaining networks is that their management can be linked to cultural means of decision making. For example, in Laos, one of the main impediments to successful networking was that there was no recognition of the importance of informal decision making. “Decision-makers treat all meetings formally, which makes it difficult to exchange ideas, and difficult to approve the outcomes of such meetings”.

The location of the secretariat or coordination unit can also be a contentious issue. Often there is no option; the secretariat has to be within the donor due to weak institutions or politics. The positive aspects of this are that there is an existing infrastructure. The negative aspects highlighted by Bernard (1996) are that the administrative costs are generally much higher with a donor base as, whether it is in a developed country or not, staff and technical costs tend to be higher in a high-level organisation. Under such circumstances it is better to house network coordination with one of the partners as long as adequate support is made available in terms of finances, technical help and most importantly the host organisation gains in terms of capacity building.

One of the problems with attempting to assess the relative advantages of different approaches to research is the length of time that it takes for impacts to appear, particularly at the community level. In Mauldon’s (1999) qualitative assessment of impacts of ACIAR projects at the community level he concluded that caution must be applied when evaluating approaches to research due to the time it can take for uptake and impact to occur, and the difficulty in tracing uptake pathways. This was a view that was in accordance with the findings of Henderson (1999).

The main problem with the literature in terms of evaluating the limitations of network management is that it has concentrated too much on simple statements regarding the supposed benefits of networking without assessing in any detail the mechanisms by which they work. For example, in their paper on mechanisms for forestry research capacity building, Szaro et al. (1998) simply state that networks are essential but they are not easy to create and maintain. In spite of Byerlee's (1999) view that 'more emphasis should be placed on enhancing the efficiency and effectiveness of research systems in promoting broad-based technical change than on major efforts to target poverty directly in priority setting', there are few attempts made to understand the underlying reasons.

Management responses required to overcome obstacles

In spite of the lack of published information on network structure and function, the study revealed certain key areas that determined the level of success of approaches to collaborative research. Each is discussed below in terms of their potential for use in future research initiatives.

Planning

Planning to establish a network is a major undertaking and should not be ignored in the rush to increase collaboration amongst a group of partners. In particular, too many networks are established with little understanding of current levels of knowledge amongst all user groups, and how knowledge is transferred between organisational levels.

The necessity of planning to combine the needs of the donor agency and participating agencies must not be underestimated. The complexity of the environments in which the network might operate require a priori environment-to-network planning but it is rarely done, partly because there is not yet a well developed methodology for carrying out the assessment. One approach has been to build such mapping into the project itself making strategic assessments and planning the first stage of a network project.

The importance of balancing objectives between partners is largely because networks have traditionally had a product focus and ignored the processes involved. This highlights a dilemma. As funds become increasingly difficult to obtain donors are asking for greater levels of impact. Yet at the same time, NGOs want more and more to see an improvement to their potential to communicate. The differences in objectives between donors and NGOs is evident where NGO's interests in strengthening their own structures take precedence over achieving the donor's goals. Likewise, donors are generally more interested in results than the long-term effects of organisational strengthening. Donors do not necessarily want to fund 'fuzzy' results, particularly when the outcome could be innovations that may not be in line with donor thinking. The key question is whether the network is there to serve the clients or the members. In this regard it is important that both donors and NGOs recognise that products and processes are interactive; actions taken to promote one can undermine or reinforce the other. One example of this concerns the allocation of resources at the outset of a network project where there is often a desire for high levels of funding and technical input, tightly managed and targeted to get things set up and quickly off the ground. One unintended consequences of such designs, however, is sometimes to inhibit development of strong participatory management by limiting the input of members in initial design decisions. The situation is complicated further by uncooperative network partners who see networks as an opportunity to get resources rather than as a chance to increase research capability through collaboration.

Although it is not surprising that donors use networks to further their objectives, the study revealed that the most successful networks were those where donors did not determine the research process too strongly. However, this was only possible where personnel and

resources existed to delegate responsibility and action. Donors are generally only likely to be encouraged to support higher levels of participation in decision-making where there are believed to be strong knowledge transfer mechanisms in existence. This highlighted the dilemma that several interviewees mentioned, between supporting effective networks and assisting their creation. Participants at the project workshop identified a lack of willingness by donors to "take a chance" on establishing new initiatives that did not have a proven track record of success. The reluctance for donors to support new networks suggests the need to build in a feedback mechanism to assist in their own learning process from past projects, and to look more closely at the value of potential partners, not just present ones.

While good planning is not the only factor influencing the level of success in networking its value in helping to assess and clarify what they hope to achieve, and specify their long-term goals and medium and short-term objectives should not be underestimated. Network management is not simply a mechanism that stops at the experimental stage but which continues through the utilisation phase. Long-term planning is characterised by a vision of uptake of project outcomes, and is usually accompanied by long-term funding (for example Lauridsen and Kjaer 2002).

The need for strong national research capability

Differing views are evident regarding the importance of national research capability with respect to the value of networking in forestry research. The prevalent view that the existence of strong national research institutions as the most important aspect of networking has to be tempered by the lack of critical analysis to substantiate it. While it is logical, and perhaps even self-evident, that strong national institutions should provide the basis of strong international networks it is perhaps a little too easy to consider this to be an essential component of networks. While there is no doubt that successful national institutes can facilitate networks by assisting knowledge transfer there are examples of successful networks that operate within an inherently weak regional structure through focussing on knowledge creation and capacity building. However, it is worth noting that certain areas of the world are quite different in their networking strengths. In some cases (for example southeast Asia, and in particular the Philippines) a strong networking culture has emerged from an advocacy base. This has meant that establishment and facilitation of networks is less dependent upon national institutions than in other areas where social linkages between groups are traditionally weaker. This lack of networking history coupled with poor funding and weak institutional linkages is undoubtedly a major problem in many international networks in Africa. However, it is important that the difficulties of creating successful research and development networks in Africa do not provide justification for donors to avoid attempts to improve the situation. It is precisely the situations where the complexity of problems is coupled with lack of resources and expertise that networks can be most valuable. Networks in Africa require more extensive commitment of resources and time for operational activities such as experimentation, attendance at meetings and institutional support if they are to improve their effectiveness (Bernard 1995, Sayer et al. 1994).

In regions where national research capacity is weak it is important to consider the degree to which international organisations can deal independently with forestry research issues that require immediate attention, without depending on support from national institutions. In addition it is important to develop strategies that might be adopted to enhance the capacity of national institutions to a level that will permit them to contribute actively to the solution of problems for which research collaboration is essential.

Choice of research partner

A group of institutions and individuals that have the ability and will to work closely together provides the basis for a successful network. Compatibility among institutions participating in networks and the overall structure of the network itself are important factors contributing to network effectiveness and in this regard it is often useful to have partners recommended by

in-country representatives who are often best placed to understand the complex nature of local personal and institutional relationships. Problems can arise due to differences in structure and organisation, language or political and social philosophies and mismatches between network objectives, functions and organisational structures with those of participating institutions will be a major obstacle to the effective functioning of the network. Partners need to recognise that there is a commitment related to collaborative research and that success is dependent on joint action.

The importance of strong personal relationships in order to run successful networks was highlighted by several interviewees to the extent that some considered it necessary to have the ability to eject non-participating members.

Defining the problem

The problem that is being addressed must be clearly defined and a research agenda agreed. The following key points should be observed:

- The problem should be common to several participants
- Strong self-interest must exist in each collaborator who must be willing to commit some resources
- Outside funding should exist at least for the birth and initial functioning of the network
- Staff must be sufficiently trained and expert to make significant contributions
- Strong leadership is required, having the confidence of all the participants in a network
- Information should be shared among all collaborators through a range of media
- Participants should develop mechanisms for the extension of research results to the eventual user
- Networks should not be considered permanent institutions but should show flexibility to cope with the range of skills and requirements of the participants
- Local institutional continuity and commitment are needed

To increase member participation, network members should negotiate clear objectives and principles, and then establish operating plans based upon them**.** Networks should establish founding agreements that describe working principles, and operating plans that translate principles to actions.

While it is often necessary for donors to take the lead in network establishment network members are likely to feel a greater sense of ownership in the network if they make some level of financial commitment. This not only helps in the generation of participatory plans but is also likely to prove an incentive to produce results on time (for example, CAMCORE 2000).

Management

In order to achieve successful research management it is necessary to look more carefully at the management structures available and tools needed rather than assuming that networks will run themselves. There needs to be recognition that networks are an entity that needs to be identified and managed. There is still an assumption amongst many donors that the establishment of a network is all that was needed to ensure knowledge transfer and that building networks that provide structural links between different groups will somehow automatically produce knowledge creation and sharing.

The findings of the study were that network management is a specialist task that is both complex and time-consuming. While the broad functions that networks serve are overarching and apply in many contexts and situations and are relevant to most kinds of research the actual type of management structure best suited to deliver results may vary depending on objectives.

Where research was the principal objective, the key issue appeared to be the ability to develop local or regional knowledge into meaningful impact. In such cases national based networks were frequently seen are far more likely to succeed than international ones due to their ability to capitalise on common interest and existing relationships. For the same reason, where collaboration between countries is necessary regional networks were frequently favoured over larger international ones.

Networks aimed principally at developing capacity appeared to operate most effectively where there was a close link between scientists, extension workers and farmers, either as locally based networks per se or large networks made through a network-of-networks structure. These were most effective where frequent interaction with all levels of management were encouraged. At this level networks are more likely to collaborate with local institutions and groups, and to promote integrative and interactive activities thus encouraging the development of social and human capital.

In determining network or organisational structure the basic question is not whether an informal or formal structure is better but which structure is most appropriate for a specific network or organisation. Light structures are particularly useful in allowing networks and organisations adapt to rapidly changing situations at global and local levels, whereas more formal structures can be useful in ensuring participation and accountability. However, it is essential that simple divisions between networks and individual projects do not confuse management decisions. It is possible to combine both formal and informal structures within either a network or an individual project. In choosing the correct management structure it is important to remember that networks, and especially relationships that contribute to them, are a continuum ranging from high to low levels of interrelatedness.

Networks frequently exhibit high degrees of horizontal integration and information transfer while individual projects tend to exist within a structure that relies more heavily on vertical integration. The 'flat' management models that are becoming increasingly common in business have developed in response to a perceived need to become more responsive to customers needs. The increasingly participatory approach of business networks, where 'front-office' personnel are given the opportunity to participate in decision-making (Biemans 1996) should enable an increase in effectiveness to collaborate with geographically dispersed operations. Increased devolvement of activity is seen as being a natural progression from more hierarchical-based models of management.

Regional support networks

One approach taken to address the limitations of the long-term nature of forestry projects and the lack of trained staff, research facilities and funding has been the establishment of regional support networks. For example, the Forestry Research Support Programme for Asia and the Pacific (FORSPA) and the Forest Tree Improvement Programme (FORTIP) have not only been effective in stimulating forestry research and in establishing avenues for rapid dissemination of new information among network members, but they have also acted as a stimulus to generate new research activities and networks including the Asia-Pacific Association of Forest Research Institutes (ApAFRI), TEAKNET and the Asia-Pacific Agroforestry Network (APAN), the Regional Wood Energy Development Programme (RWEDP) and the International Network for Bamboo and Rattan (INBAR). Part of the process of supporting regional research initiatives is to foster inclusion of existing organisations and networks in new networks. For example, the Forestry Research Network for sub-Saharan Africa, FORNESSA, has 25 participants representing sub-regional forestry research networks throughout the region (AFORNET, AFREA, CORAF-Foret and SADC-FSTCU-Forestry Research Committee).

A significant strength of regional and sub-regional organisations reported by Stickins (2001) is in their ability to coordinate support work to research networks. An important element of this activity is to foster linkages between networks and to minimise the repetition of similar work in different places. An example of this is provided by Gass and Laliberté (1996) who report that IPGRI manages sub-networks for species that are not adequately taken care of by national or international networks.

Participation and ownership

A recurring issue throughout the study was that of the relationship between ownership and success of the network. If ownership is considered to be the level to which participants work within rather than for a network then it has several components, the most important of which are participation in priority setting and management. Successful networks encourage development of goals by participants and, crucially, continue to review and if necessary change them throughout the lifetime of the network. Creating common goals is often a challenge where several organisations, particularly donors, may have different ideas and highlights the importance of strong social interactions within networks. Where getting the job done without creating a shared identity occurs the network is more likely to remain dependent on the outside initiator, usually the donor, allowing initial objectives (often set by the donor) to continue guiding activity rather than seeking to adapt or integrate activity with local needs and condition. In this respect the degree of formalisation that is necessary must be considered carefully. The dilemma is how to best accommodate the legitimate concerns of the donor for accountability and predictability with the flexibility and adaptability necessary to allow networks to capitalise on their ability to develop knowledge.

The importance of face to face discussions and verbal interaction cannot be underestimated. Despite the difficulties involved with travel, the need to transfer tacit knowledge as part of effective network management means that this level of communication is essential for knowledge transfer in situations where a cultural element is evident. The 'sticky' nature of knowledge means that it has to be continuously managed through communication rather than assume that it flows on its own.

The development of trust is an essential, but frequently overlooked, component of successful collaboration. Both funding agencies and the networks and organisations that they support should take responsibility for building trust through development of dialogue, good working relationships, and identification of common goals.

The study suggests that networks that have a high level of input from all levels of participants at the early stages create a stronger basis from which to operate than those that which are created, managed and maintained with minimal input from end users. In order for decision-making to be shared more widely, processes and structures must be created which can serve as the mechanisms by which network members can participate**.** For most networks, this means that network members or their representatives must meet regularly in order to make decisions. Such meetings, whether they are formal or informal, need to encourage information flow in all directions and ensure that the information generated by network activities is turned into knowledge.

Donors need to examine any potential conflicts between priorities within the network at all managerial levels. They also need to recognise the potential impact their activities may have on the institutions from which they draw their members. The risk of weakening capacity by drawing staff efforts into collaborative activities which do not contribute to organisational goals can be addressed through: increased contribution by local institutions; stronger communication among donors; and fuller participation by members in determining where the balances can best be made.

Sharing research issues between partners is an issue that donors frequently ignore within their own organisations. However, it is pointless attempting to increase the effectiveness of research and development work with a client research network if the coordinating organisation does not employ some of the same improvements to effectiveness. In this respect donors may need to improve knowledge transfer systems between levels within their own structures. In some cases this can be achieved by utilising more fully the explicit knowledge held by researchers in priority setting for larger research programmes. Donors are frequently guilty of not establishing communities of practice within their own organisations and not practicing the philosophy of collaboration they are attempting to promote. Different sections can jealously guard information that could be of use to others until they are ready for publication. In this respect organisations may consider that there are opportunities for researchers to collaborate, while in reality there is little encouragement given to cooperate with policymakers on the implications of their work. The main benefit to donor programmes from creating stronger knowledge pathways with their own researchers is that they can gain relevant assistance in determining research strategy and increase opportunities for innovation in research thinking.

The coordinator

The functional size of a network may differ considerably from the actual size. A large network may contain many inactive partners and thereby give a false impression of its likely value. The ability to utilise the partners within a network is determined to a large extent by the ability of the coordinator to create an environment in which individuals want to contribute towards shared goals. The importance of the network coordinator was constantly stressed in the case study interviews. The position of coordinator was in many cases seen as the lynchpin of the network and the necessity to exhibit high levels of ability in interpersonal communication at all levels was referred to frequently. While in theory, the coordinator implements the wishes and decisions of network members as articulated through the steering committee or other advisory body, in reality, it is often the coordinator who holds the network together. For this reason, the choice of coordinator is crucial and can be the defining factor in the success or failure of a network, both internally and externally.

The most important characteristics of a coordinator as defined by network participants through interviews were the strength in dealing with partners at all levels, flexibility to accommodate different views and ability to provide support to weaker members in terms of involvement in network activities. Without these inputs and skills it is considered that networks can fall apart: members lose interest, bypass the coordinator and go straight to the donor.

While in many cases donors make the selection of coordinators, it is often the reputation of the coordinator that is a key factor in determining whether organisations decide to join the network. In some cases the role of coordinator is expected to rotate among members as part of a process designed to contribute towards a sense of ownership of the network by participants. In practice, because the role of coordinator is generally seen as onerous, original coordinators tend to get reappointed.

Strong knowledge transfer mechanisms

Two components to knowledge transfer were identified. Firstly, the knowledge pathways and, secondly, the diversity of participants contributing to knowledge transfer. A variety of experience, knowledge and interests offers the potential for considerable new learning, or accommodating new ideas and practicing new skills, as differences are explored and negotiated through shared activities.

There is now a basic assumption that knowledge is the most important commodity on the business world. Beeby and Booth (2000) point out that in business there is increasingly a “knowledge-based view of the firm” in which knowledge is seen as the resource upon which

companies base their competitive strategies. This view has fostered the widespread development of KM strategies. In forestry research development it is not clear whether knowledge is regarded so highly. Donor and policy makers in particular need to be clear on what knowledge they are attempting to secure, who produces it, why, and by what means it will be stored and, most importantly, how it will be shared so that it not only maximises the benefits but also provides the best opportunity for growth. In this regard it is interesting to note Allees' (2000) comment that many private companies attempted to address KM via technology in the first instance and generally found it did not work. There is now a general view across the business world that KM is about people and, by natural progression, that networking amongst individuals and organisations is an integral part of organisational success.

Utilising existing knowledge networks is an essential starting point to network development in order to save time and resources. Hanyani-Mlambo and Hebink (2000) report on the establishment of informal knowledge networks amongst farmers in Zimbabwe who have established links with research and extension networks designed to improve tree planting of indigenous trees. The initial lack of ability of scientists to tap into local (implicit) knowledge meant that they did not understand the limitations facing the farmers, but extension agents now act as a link between the two networks. By facilitating the exchange of knowledge between researchers and innovative farmers, the sorely needed feedback system in forestry technology development processes will be established.

Warburton and Martin (1999) also stress the need to find out who has what knowledge before embarking on research projects. The depth of knowledge about natural resources amongst local people may vary depending on their familiarity with the resources, the differences in responsibilities and differences in individual interest and intellect. In this respect they point out the importance of cultural understanding of differences in knowledge absorption, understanding and description. But, local knowledge networks do not necessarily have to deal exclusively with implicit knowledge. Gerrits (2000) in his discussion of the adoption of *Calliandra calothyrsus* in Kabale District, Uganda, identified certain key factors that enhanced widespread adoption of this introduced tree species. The presence of many organised farmer groups who shared information on a frequent basis provided a favourable environment for awareness creation, farmers training and distribution of planting materials.

Garforth and Norrish (2000) highlight the importance to development of research programmes of understanding where farmers receive information and how they use it. They state that the main source of information for farmers is likely to be other farmers. This suggests that the front-end delivery system for movement of tacit and explicit knowledge both ways with farmers is not dependent upon either networks or independent projects but is determined by the strength of knowledge transfer pathways between farmers and NGOs.

Monitoring and evaluation

The benefits of monitoring and evaluation in the case studies included identifying what works and what doesn't, highlighting the impact of activities, planning and strategising, increasing accountability for actions, strengthening of links with partners and improving institutional memory. Monitoring and evaluation schedules can provide an opportunity for networks to grow and cooperate more closely. Although what is learned may be very different for different stakeholders the combination of tangible aspect of the results of evaluation (e.g. improvements to the whole network process and its outputs) and the more intangible outputs (e.g. team spirit, trust, responsibility) can contribute to the sense of ownership that is so important to successful networks.

It is important to distinguish between the outputs of the network and the performance of the network itself. Most evaluations concern themselves with the former, i.e. is the network

producing what it set out to produce? There are few, if any, examples of where forestry research networks are assessed in terms of their management and organisation. This point is worth emphasising because many networks will probably consider that they do indeed assess their own performance through informal means (possibly through discussions and correspondence with partners). However, it is rarely stated that this is an objective and therefore may not be taken too seriously by either the partner or the manager.

Successful monitoring and evaluation strategies for both networks and individual projects are based on principles of clarity of purpose and participation. The design needs to incorporate an understanding of what needs to be monitored and why, who are the stakeholders, what will be evaluated, who will participate and carry out the evaluation, how reporting will be carried out and how the results of the evaluation will be used. In addition, the process for reflection on results needs to be incorporated into overall planning and include different user groups.

One of the difficulties that networks often face is how to adapt the recommendations for use in a network that is spread out and made up of diverse groups and individuals. The network members may find themselves in very different situations so that the results of an evaluation may not be appropriate or feasible for all. A poorly designed and implemented evaluation can result in conflict and major disagreement among the various stakeholders as to its conclusions. A well prepared evaluation needs to take into consideration the diverse needs and situations of the different stakeholders and mechanisms need to be built into the evaluation design to deal with conflict and disagreement in case these should arise. Recommendations can be directed to these different stakeholders according to their needs and situations.

Funding

The need for a long-term commitment of funds is generally regarded as one of the most important issues relating to the success and development of the network. Although there are examples of donor-funded networks continuing after financial support from the donor has been removed (for example the South Pacific Regional Initiative on Forest Genetic Resources (SPRIG) continued for well over a year when donor support was not available (Midgeley pers comm.) few research networks can survive solely on contributions from members and are usually heavily dependent on donor support. Removal of funds generally spells the end of the network, yet is frequently misinterpreted as an indication of lack of commitment from participants. Ideally network members should be closely involved in decisions related to external funding but in reality it is an issue that is usually determined by only a small number of people involved in the network.

Flexibility

The review found that networks generally have a distinct comparative advantage over individual projects in their inherent flexibility to adapt over time to changing circumstances. The responsibility of managing change is often difficult for donors to embrace and inevitably means less precision in terms of quantifiable outcomes in the planning process, and often less control over network evolution. However, the study indicated that networks function to best advantage where they are not cast in stone, but supported in their evolution, possibly to the extent of increasing the timescale of donor support.

The role of the donor

Research programmes are established too frequently with the objective of creating impacts for a wide list of potential beneficiaries with little of no evidence of the most effective manner in which this can be achieved. The assumption that identification of potential beneficiaries will somehow automatically produce benefits is one that is prevalent amongst donor organisations rather than NGOs and it is in this regard that it is particularly important to examine the role of donors in the research process. In an ideal situation, research and

development institutions should be able to interact with each other, ascertain their mutual interests and identify mechanisms for collaborative research in areas of common concern. However, there are many barriers to institutional communication that make it difficult for them to find common ground for the establishment of research collaboration. Consequently, most collaborative research is initiated, facilitated or supported by international organisations to some degree. They are able to see the larger picture, assess needs and capacities objectively, and catalyse or lead collaborative arrangements. In addition, because substantial transaction costs are required for the development of research networks, support from such facilitators is often essential (Nair and Dykstra 1998).

While donors often have a catalytic role to play in networks the power they have to set the agenda for collaborative research is an issue that causes much resentment amongst researchers and NGOs. The situation is aggravated by a perception of northern donors placing too much emphasis on quantitative means of project assessment. Perceptions of donors making ill-informed decisions with little experience of local issues and current levels of knowledge only serve to emphasise the need for participatory approaches to priority setting and management.

Many researchers believe that it is inappropriate to measure networks against conventional, western, scientific criteria of “objective” criteria, quantifiable indicators, and a lack of peer review. A common view held by network participants is that funders over-emphasise the need for accountability, while many donors feel that networks do not take enough care over the issue of outputs. In some cases this may mean that the evaluation process is seen as a challenge by the network to prove its worth. Any potential to learn from the evaluation becomes diluted. Such evaluation brings out unequal power relations between donors and those they fund, and makes it extremely difficult to develop a relationship of cooperation or partnership. Networks often feel that donors focus too heavily on the product rather than the process and that they are relatively rigid and inflexible in approach.

Swann et al. (1999) argue that the cognitive network model (based on a linear thinking approach common in the West) is too restrictive in many ways and can defeat the objective of communication by creating rigid and unnatural means of communication that are ultimately unproductive. Their view is that outputs from networks can be improved by supporting a community network approach where the emphasis is on personal communication between all levels of the research structure. They believe it is only through adopting this approach that it is possible to foster innovation. This raises the question of whether or not forestry research networks have a desire to create an environment that encourages innovation.

It is important that donors recognise the special nature of networking. This entails not only evaluating the qualitative aspects of the process but recognises the need to identify the developmental phases of a network. Issues such as knowledge management need to be recognised as major outputs of networks rather than simply part of the operational process. Likewise, the developmental phase of the network needs to be identified in order to provide the support it needs to develop to the next stage.

The challenge networks face is to show funding agencies what networking can achieve, and also what is not possible. Direct tangible results cannot and should not always be expected. Funding agencies need to improve their knowledge of networking and the kind of support that networks need. They also need to rethink their criteria in relation to networks. The unique ability of networks to develop social and human capital through the networking process needs to be valued and emphasised if this approach to collaborative research is to reach its full potential.

6. CONCLUSIONS

While it would be tempting to conclude this study by stating that research issues fit neatly into categories that determine whether they should be addressed by networks or individual projects, the picture is much more complex. It may be true that individual projects are more effective at dealing with local issues related to organisational learning or capacity building, and that international networks may be more effective at tackling global research issues or disseminating outputs but this information is not new. Admittedly there is little evidence of an acknowledgement of how to use different research structures even at the broadest level but this is due more to a lack of analysis by donor agencies of existing literature rather than an absence of such information.

Some authors have attempted to create simple organisational models that attempt to highlight major features of researchable issues and the environment in which they are addressed. Using these models they have categorised approaches to developing research structures, particularly networks, that are apparently logical in appearance but lack appreciation of the myriad factors that surround the relationships between individuals and organisations carrying out the research. For example, issues such as the strength of knowledge transfer pathways or the level of trust that exists between different participants are difficult if not impossible to measure, and are consequently absent from any published attempt at classification of research structure.

This study has highlighted and discussed the main areas by which research issues should be evaluated in order to determine whether they should be addressed by networks or individual projects as follows:

- ***Knowledge creation***

  In an environment where there is an increasing emphasis on knowledge as a primary output it is becoming more important to identify where and how it is created. It is essential to understand the differences between tacit and explicit knowledge and how they can be used within the research structure. Certain knowledge types relate to specific organisational levels and can be developed though focussing on the relationships within and between specific project partners.

- ***Knowledge exchange***

  In order to be able to utilise knowledge there has to be an understanding of how it moves between different levels within the organisational structure through various knowledge transfer mechanisms. In this regard, the relationship between individuals and organisations within the research structure will determine to some extent where to focus research effort.

- ***Creating increased cohesiveness amongst partners (often referred to as 'networking')***

  This is perhaps the most important and most undervalued aspect of collaborative research. The ability of networks to develop and enhance social and human capital is a major output of networking but remains largely unrecognised.

- ***Capacity building***

  A major objective of many research initiatives is to increase the ability of partners to undertake research themselves. The choice between networks and individual projects to

support capacity building is determined largely by factors surrounding donor objectives and local and regional research capabilities.

The future of networking

Nair and Dykstra (1998) provided the most detailed review to date of the value of forestry research networks and suggested different scenarios for their development ranging from low to high levels of adoption. But they acknowledged that the future development of networks is impossible to determine. Research priorities, particularly those of donors, and availability of resources will be the major factors that influence the use of individual projects and the development of networks.

There is, however, evidence to suggest that networking is being increasingly developed for strengthening national research systems. For example the Canadian Forest Service (CFS) has adopted a national network-based approach to deliver a science and technology plan. The programme covers ten areas and creates partnerships and alliances between the CFS and outside agencies, undertaking specific projects, and identifying and addressing strategic national issues (www.nrcan.gc.ca/cfs/proj/sci-tech/o_view_e.html).

International research programmes would have a limited impact without appropriate participation and complementary research by national institutions. With a few exceptions, developing countries do not have the adequate capacity to participate in international research projects and to capitalise adapt and transfer results to the local level. Strengthening national research systems in order to link them effectively to both the international research community and local users will remain an issue of great importance. A regional approach is generally preferable as shared and coordinated support at the regional level is an efficient means of strengthening national forestry research systems while developing adequate co-operation among them (Sayer 1998).

If approaches to forestry research follow organisational development models from business it is likely that we will witness an increasing level of interdisciplinary activity. This may appear to favour the development of research networks but, as is the case with many of the comparisons between networks and individual projects in this study, there may be a strong case for favouring individual project depending on the particular conditions of the case.

The study has illustrated the forestry research lags far behind business in understanding how networks operate and the potential for their use. The more competitive environment of private enterprise has generated a significant body of literature that analyses the value of networks and indicates strongly that networking is a strategy that is being increasingly adopted by companies. For example, Möller and Halinen (1999) note that the competitive environment of firms is undergoing a fundamental change and traditional markets are being rapidly replaced by networks. This poses major managerial challenges for industrial and high technology companies. From a conceptual point of view, this means that they have to look beyond ordinary customer and supplier relationships into intricate webs of firms forming research and development networks, deep supplier networks, and competitive coalitions.

The business literature also highlights the acceptance of knowledge transfer mechanisms in the development of corporate objectives. Companies have increasingly found that customers have provided invaluable feedback to product development, and cooperation between customers and managers is accepted as necessary in product development. This increases the justification for increased participation in networks at every level (Biemans 1996). Swann et al. (1999) frequently highlight the importance of investing time and money into creating an environment where people are able to meet and discuss issues in order to

move organisations forward. It is under such conditions that the flow of knowledge, particularly tacit knowledge, is likely to be encouraged most successfully.

Allee (2000) reports that around 80% of global corporations have some sort of knowledge management initiative. Although key ideas for KM may come from the business world the genesis of their appreciation of knowledge as a commodity is very different from that in development. In business they have undergone a transition in thinking from believing that knowledge was power and therefore had to be protected to now believing that sharing knowledge increases the possibility of using it and making organisations stronger. In this respect it is interesting to note that while business and science for development discuss networks each has focussed on the area where the other is weak. In the case of business there has been an emphasis on looking for technical solutions to the idea of networking (e.g. IT solutions) while they are only now developing the concepts of 'cognitive knowledge' and 'communities of practice' that have been accepted in development for some time. Conversely, while science for development has accepted the value of personal interaction to solve problems it has not looked carefully enough at the structure and continuity of networks. According to Swan et al. (1999) firms are only now beginning to acknowledge that explicit knowledge is often already known by their staff and that tacit knowledge can only be transferred by key individuals who have the correct experience/knowledge and the skills required for informal means of communication. This suggests that donors need to utilise their own knowledge sources more effectively and networks need to focus on key individuals taking a lead role not only in knowledge transfer but also in coordination. Bernard's (1995) findings are in agreement, that donors should identify key relationships within networks while not attempting to control them.

A new network for donors

If the assertion of Debackere et al. (1996) is correct, that one of the main benefits of networking is the generation of innovative ideas, it would appear that there is scope for advisory networks to be established to support decision-making within donor's research programmes. This could encompass a much wider range of partners than is currently the case, and would not only provide a more effective means of getting participatory input into project initiation but would also provide the potential for new partnerships to develop *amongst* developing country partners.

Networks or individual projects?

The main lesson to learn from the both the literature review and the case study examples was not whether a network or individual project was best, but to analyse each component of the research process and determine whether it worked, and how it could be improved. In addressing a typical research issue it is likely that there will be opportunities to use both networks and individual projects. For some elements it may be most important to collaborate with a range of partners that can only be achieved by networking, while for other parts it may be that an individual project is most appropriate to create an effective knowledge transfer mechanism. What is most important is to identify the key elements of collaborative research and learn how to apply them for maximum effectiveness.

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APPENDIX 1

Case study organisation details

Organisation:	Agharkar Research Institute
Contact details:	www.aripune.org/cpari/index.asp
Summary of objectives:	ARI is an autonomous, grant-in-aid research institute of the Department of Science and Technology (DST), Government of India. Its activities cover crop improvement, insect biocontrol and plant biodiversity.
Date visited:	22 March 2000
People met:	Dr V.S. Rao (Director) Dr V.S. Ghate (Scientist)
Organisation:	Association of Forest Research Institutes in Eastern Africa
Contact details:	kefri@arcc.or.ke
Summary of objectives:	AFREA was established to support research initiatives between forestry research ers in eastern Africa and also to promote capacity building and improve collaborative research capabilities of partner organisations.
Date visited:	19 April 2000
People met:	Dr B. Chikamai (Coordinator)
Organisation:	BAIF Development Foundation
Contact details:	www.baif.com
Summary of objectives:	BAIF's mission is to create opportunities of gainful self-employment for rural families, especially disadvantaged sections ensuring sustainable livelihoods.
Date visited:	13-16 March 2000
People met:	Dr J. Daniel (Head - Tree Domestication) Dr A. Ashwini Ghorpade (Social Scientist)
Organisation:	European Forest Genetics Network
Contact details:	www.ipgri.cgiar.org/networks/eorgen/euf_home.htm
Summary of objectives:	Activities focus on the inventories of genetic resources, development of joint databases and lists of descriptors, identification of common research needs and promotion of the establishment of national gene reserve forests as part of national conservation programmes.
Date visited:	16 Sept 1999

People met:	Dr J Turek (Coordinator)
Organisation:	The Food and Agriculture Organisation of the United Nations
Contact details:	www.fao.org
Summary of objectives:	Development and conservation of global forestry resources
Date visited:	15-18 Sept 1999
People met:	Dr O Souvannavong
Organisation:	Forages for Smallholders Programme
Contact details:	R.Roothaert@cgiar.org
Summary of objectives:	Development of forage crops for farmers in Vietnam, the Philippines, Indonesia, China and Lao PDR.
Date visited:	2-3 Oct 2000
People met:	Dr R. Roothaert (Coordinator)
Organisation:	Green Foundation
Contact details:	www.green-foundation.org
Summary of objectives:	The Green Foundation works with a network of 500 farmers in 100 villages to save seeds, look at means of integrating conservation into AF systems and improve soil fertility.
Date visited:	21 March 2000
People met:	Dr Vanaja Ramprasad (Director) (interviewed by telephone)
Organisation:	Institute for Forest Genetics and Tree Breeding
Contact details:	envfor.nic.in/icfre/ifgtb/ifgtb.html
Summary of objectives:	The institute conducts research on all aspects of genetic improvement of forest tree species in India. It also conducts research in eco-restoration of the Western-Ghats forest and conservation of the genetic diversity of the tropical evergreen forests.
Date visited:	18-19 March 2000
People met:	Dr K. Subramanian (Director) Dr G. Singh (Head – Seed Technology) Dr S.S.R. Bennet (Head – Genetics and Tree Breeding) B. Nagarajan (Scientist)
Organisation:	Integration of tree crops into farming systems project
Contact details:	Meckert@cgiar.org

Summary of objectives:	To support and develop farmer initiatives designed to improve tree use on small farms in Kenya and Tanzania
Date visited:	19 April 200
People met:	Manfred van Eckert (Project coordinator)
Organisation:	International Centre for Research in Agroforestry
Contact details:	www.cgiar.org/icraf
Summary of objectives:	Variety of activities focussed on development of agroforestry resources for poor farmers.
Date visited:	17-20 April 2000
People met:	Richard Coe (Principal Scientist) Roeland Kindt (Scientist) Polly Eriksen (Scientist) Steve Franzel (Senior Scientist) Kwezi Atta Krah (Senior Scientist) Ard Lengeek, (Scientist) Ian Dawson (Scientist) Hannah Jaenicke (Scientist Scientist) Tony Simons (Senior Scientist) James Were (Scientist)
Organisation:	International Plant Genetics Resource Institute
Contact details:	www.cgiar.org/ipgri
Summary of objectives:	Variety of activities focussed on conservation of global plant genetic resources.
Date visited:	15 Sept 1999
People met:	J. Watts (Impact assessment specialist) I. Thormann (Researcher – Impact assessment) B. Laliberté (Impact assessment specialist)
Organisation:	National Chemical Laboratory
Contact details:	samukherji@yahoo.com
Summary of objectives:	Research centre funded by national govt and sponsorship working with patents, looking at active ingredients for the development of pesticides.
Date visited:	22 March 2000
People met:	Dr S. Mukherjee (Head – Entomology laboratory)
Organisation:	Neem Foundation
Contact details:	www.neemfoundation.org
Summary of objectives:	The Neem Foundation is a voluntary, independent, non-profit organisation. It claims to be ‘the apex body

	of all Neem movements around the world'. It has a mission to promote global awareness about Neem and other botanical alternatives.
Date visited:	17 March 2000
People met:	Dr P. Thakkar (Trustee)
Organisation:	Regional Centre for Training in Community Forestry
Contact details:	www.recoftc.org
Summary of objectives:	RECOFTC works in close collaboration with partner organisations to actively support community forestry development in the region by promoting dialogue between multi-stakeholders to ensure equitable management of forest resources.
Date visited:	8-11 Sept 2000, 9-12 April 2001
People met:	Dr C. Veer (Senior Programme Specialist) K. Edwards (Training Specialist)
Organisation:	Regional Land Use Management Unit
Contact details:	www.sida.se/sida/jsp/crosslink.jsp
Summary of objectives:	RELMA was launched in 1998 as the successor to RSCU. It aims to develp a full concept of water management – for households, livestock, fish farming, irrigation and sanitation – that makes up land management.
Date visited:	19 April 2000
People met:	Tom Anyonge (Natural Resources Manager)
Organisation:	Southern Africa Forest Genetics Research Network
Contact details:	Forest-genetic-resources@fao.org
Summary of objectives:	A regional programme to develop and conserver the forest genetic resources in Sub-Saharan Africa.
Date visited:	16 Sept 1999
People met:	Dr O Eyog Matig (Coordinator)
Organisation:	Tamil Nadu Agricultural University
Contact details:	dbs.tn.nic.in/tnau/about.htm
Summary of objectives:	TNAU carries out a range of research and development activities to support rural afforestation and tree management in India. They are involved with a range of networks operating at international, national and local levels.
Date visited:	20 March 2000
People met:	Dr S Chellamulhu (Professor & Head Dept. Of Forest

Soils)
K.T. Parthiban (Assistant Professor - Forestry)
Prof. K Sankanan (Professsor Soil Science and Agricultural Chemicals)
Dr S. Thirumurthi (Professor of Entomology)
Dr V.M. Srinivasan (Professor & Head of Silviculture)
Dr M. Paramathma (Associate Professor - Tree Breeding)

APPENDIX 2

Workshop Information notes and presentations

First Information Note

Regional Workshop on
Facilitating Networks to Support Community Forestry Development
Tentative dates: 14 – 16 March, 2001
Tentative place: to be confirmed.

Background and rationale

It is well recognized that community forestry development requires contributions from different types of organizations. As demonstrated in the 9th FTPP review and planning meeting on 'facilitating collaborative arrangements' there are various types of community forestry support networks operating in the countries represented in that meeting: Indonesia, Cambodia, Vietnam, Thailand, Philippines, India, China, Nepal, Bangladesh, and Pakistan.
The discussions also revealed that many of these networks face considerable problems that seriously constrain their effectiveness. Please refer for a summary of these discussions to Annex 1. It was felt that the causes of these problems and ways of dealing with them are often inadequately understood. Hence the participants in the meeting strongly recommended to try to address these issues in future activities. It was, however, less clear how these could be addressed.

The Forestry Research Programme of DFID and the University of Oxford are investigating the efficiency of forestry research networks. They are in the process of designing an analytical framework for the diagnosis of networks and ideas for how to deal with some of the problems in networks.

Hence, RECOFTC and FRP decided to collaborate in the organization of this workshop and invite community forestry (and/or participatory NRM) network facilitators to contribute and share their experiences and test the emerging framework for improved network management, suggest further improvements in this based on their experiences and recommend follow up action to improve the efficiency of community forestry support networks.

Objectives of the workshop

- Improved understanding of common issues in community forestry support networks in Asia,
- Analytical frameworks for diagnosing network issues and strategies for addressing these, shared and adapted,
- Collaborative action for improving network efficiency identified.

Workshop preparation process

A large group of people involved in the facilitation of community forestry networks or collaborative arrangements in Asia will be contacted, through this information note and the 2 attachments.

Those who complete the attached 'questionnaire on network efficiency', return that by email (to ftccor@ku.ac.th) or otherwise before 25 January 2001, AND indicate their interest in participation will be considered for invitation to the workshop.

If there are more than 20 people interested to participate, the organizers will select participants and inform both those selected and those not selected, of the reasons (criteria) for selection. These will include geographic considerations and network objectives.

We will try to include all those who have indicated interest, in follow up activities.

A program for the workshop will be distributed in early February, together with a more detailed information note and invitations.

We hope to hear from you soonest and hope to meet you in March.

Cor Veer and Alan Pottinger

Annex 1. Identifying Issues and Solutions in Collaborative Arrangements[10]
Based on the first round of sharing experiences and issues in collaborative arrangements, participants were grouped according to their main line of work and asked to focus the discussion on grassroots networks, networks of CF support networks or working groups, national networks and international networks. They were asked to identify the main issues at each of these 'levels' and explore solutions to these problems.

Support Networks:

A. South Asia:

Issues:	***Solutions:***
1. Resistance of decision-makers towards collaboration	1.1 Support to decentralization and devolution of power 1.2 Advocacy 1.3 Solicit support from donors 1.4 Creating enabling environment for government officials 1.5 Organizing workshops on participatory and collaborative approaches for decision-makers 1.6 Institutional reforms process 1.7 Negotiation capacity of the users should be built 1.8 Start with flexible and positive people 1.9 Demonstrations
2. Lack of Appropriate curriculum	2.1 Technical curriculum needs to be tailored to incorporate social aspects 2.2 Extensive documentation and sharing of experiences needs to be made 2.3 Facilitating access to information
3. Clarifying roles and responsibilities	3.1 Support groups and partners should jointly define norms, roles and responsibilities of all the stakeholders
4. Donor driven collaboration	4.1 Capacity building and developing self reliance of partners
5. Cultural constraints	5.1 Collaboration around technical commonalties and respect of each others cultural norms and values
6. Lack of networking skills	6.1 Develop communication skills of the facilitator 6.2 Define objectives of the network clearly
7. Conflicts among different partners	7.1 Conflict management skills which includes many tools
8. Different organizations have different philosophies.	8.1 Coordination among different supporter groups is needed

B. Southeast Asia:

Issues:	***Solutions:***
1. Resistance of decision-makers towards networking	1.1 Decentralization
2. How to build the network	2.1 Identify like-minded people or institutions 2.2 Bring these people together 2.3 Create central unit / secretariat which is controlled by the partners . For example: • By voting and regular board meeting • By roving secretariat - Benefit to avoiding one group becoming the boss - Difficult to do
3. How to look for "parent organization" for networking?	3.1 Identify the "good parent organization" - credibility - good facilitating skill - should have mandate and interest to network - good organization skill

[10] From: Facilitating Collaborative Arrangements; Report of the 9th Review and Planning Meeting; Forests, Trees and People in Asia. March 2000.

4. How to build better skills for networking	4.1 Invitation should be on-line 4.2 Good facilitator 4.3 Interesting presentator 4.4 Good selection of participants 4.5 Good incentive for participants and organizers 4.6 Good documentation of meeting 4.7 Good follow-up

National Networks:

Networks	***Background***	***Activities and Scale***	***Issues in Networking***	***Possible Solutions***
Indonesian Communication Forum on CF	Est. in 1997; NGOs, Univ., Cos, Govt., Priv. Sector (multi-stakeholder): forestry reform	-policy dialogue -comparative study with other countries -supporting collaborative activities	-officials withdraw -domination by NGOs -govt. officials are scared -network membership -sustainability	-more involvement of members, -improve capacity of other stakeholders -selection of members
Forestry and Society network (China)	Est. in 1992, Govt. dept., farmers, Ngos, Foresters, Readers	-publication -research -nat. seminar -training -textbook	-top down working style -sustainability -funding support	-motivating young govt. officials -more involvement of social forestry projects
CF Network Meetings (Cambodia)	Est. in 1994; Dept. of Forestry, Ministry of Environment, NGOs, local communities	-sharing info and experiences in CF -facilitating CF process	-no clear structure of network -lack of communication -lack of interest of participants -time budget constraints -lack of incentives for organizers	-incentives -clear goal and objectives -revise frequency of meetings -produce brochure
JFM National Network (India)	Est. in 1991, NGOs, MoEF, Academics, federation reps	-sharing information and experiences -publications -organize meetings, workshops -support govt. And NGO interaction	-time and management problems –Foresters' network vs. JFM national network -new vs. old members -interest of donor to promote new concepts through this forum -overlap with other networks	-more systematic planning -more community involvement -balancing roles of various stakeholders in network activities
Forestry Roundtable (Pakistan, NWFP)	Est. in 1995; policy change/reform; Govt. dept and	-policv advice -review progress of forestry sector reform	-resistance from govt. -selection criteria for membership	-neutral secretariat -proper criteria for membership

	civil society; NGOs, users and owners	-advise on reforms	unclear -political/power issues -ownership issue -access to information -capacity of members	-funding sources -democratic working -technical support
-Informal collaborative network -Bangladesh Agroforestry Group (Bangladesh)	Univ., BARC, FD, Agr. training inst., bring people from different sectors and GO-NGO together	Newsletter Working paper Training Research	-key people left -funding -sustainability	-cost recovery through action from govt. and projects

The common issues and some suggested solutions are based on the experiences in these networks:

Issues:	***Solutions:***
1. Who should be the member	1. Proper selection criteria should be developed
2. How to sustain these networks	2. Improved capacity of network stakeholders
3. Fund problems	3. Cost recovery, activity link with projects, publication, consultancy…
4. Dynamic nature	4. Clear goal and objectives, planning activity
5. How to institutionalize network activities	5. Neutral facilitating role of secretariat
6. How to keep linkages with other networks	6. Clearly defined role of network members
7. Managing secretariats – incentives (?)	7. Improved communication and linkages with other networks

International Networks:

This working group identified some of the issues (particularly in FTP in Asia), and generated the idea of the formation of an independent network for the future:

Issues:
1. Lost context with national or local agenda
2. Inappropriate and incompatible support from network
3. Members of network do not reflect latest community forestry initiatives / movements in Asia
4. Need independence from FAO and other species
5. Need mechanism for sustainable / intensive/ systemic planning process among members of network
6. Slow response to current change in each country
7. Lack of “clear vision” to support collaborative activities (such as money, capacity building, etc.)
8. Lack of discussions on other international issues which influence community forestry

Solutions:

1. Creation of network for “setting the agenda”:
   - New Format
     a) Independent
     b) Flexible and inclusive
     c) Free membership
     d) Equal representation (national and local partners)
     e) Rotating secretariat (governance)
     f) Process of representation /election who decides who get into where
     g) Separation of powers – checks and balances
     h) Clear constitution with vision (including terms of partnerships and rights)

- Mechanisms:
  a) Learning processes for exchange information
  b) Additional mechanism for facilitating collaboration around defined agenda (including participation non-agenda sitting member)
  c) Financial support mechanism (fee membership, donor contribution, contributions from other budgets)
  d) Process to address feasibility of above format
- Substance:
  a) Regularly updated CF agenda will be set by the elected group of the network. This agenda will prevent stagnation and give guidance to working groups when they promote collaborative activities.

International thoughts: ***Networking versus Collaboration:***

Networking:	***Collaboration:***
Similar Platform	Different platforms
Information	Construction – some specific thematic
Change	objective
Singular Great	More complex
Issue	
Value – some	Multi-values
Stable	Networking can lead to collaborative
	Time Allocation and Time constraint
	Similar interest- agreed objectives

Networking and Federations Group:

A. Issues Concerning Networking
(Nepal, Pakistan, Cambodia, China)

Low participatory (turn out) in meetings
Lack of financial resources to
- Facilitate emergence of networks
- Facilitate training, meetings, workshop of networks
- Offer incentives to government officials
- Arrange logistics, implement projects
- Share information, carry out studies

Lack of coordination between support organizations
Lack of ownership by the government (and society)
Gap between government agencies and networks
Sub networks don't have equal say in bigger networks
Lack of capacities in networks. (articulate problems, influencing policy)
Lack of clear objectives
Dominated by vested interests
Lack of regular meetings

What needs to be done:
1. Constitution of a regional thematic group to focus on networking and resolve problems
2. Conducting case studies in member countries regarding networks (analyzing existing situation, identifying dynamics gaps and finding out ways to reach to ideal conditions)
3. Sharing (and synergy) of case studies
4. Organizing workshops (first in member country having rich experience in networking)
5. Follow up of decisions/developing action plans
6. Exchange of information

Second Information Note

Facilitating Support Networks in Community Forestry Development

Regional Workshop to be held
9-12 April, 2001
at RECOFTC, Bangkok, Thailand

Background
Please refer to the first information note for the background and rationale of this workshop (ask Cor at ftccor@ku.ac.th, in case you did not get a copy of that first note earlier).
The objectives of the workshop are also mentioned in that note and here recapitulated for your convenience:

Objectives of the workshop
1. Improve and share understanding of major issues in community forestry support networks in Asia,
2. Identify and share strategies to address these issues in different contexts,
3. Identify priorities for collaborative action for improving network efficiency,
4. Make plan for collaborative action.

Proposed workshop flow

We propose to base the flow of the workshop on the following 6 key questions:

1. What are some of the reasons that networks in community forestry are or were formed ?
2. What types of networks exist in community forestry and which ones are present in this workshop ?
3. What are the main challenges or issues that networks, and those who try to facilitate them, face ?
4. How can we better understand the reasons for these challenges ? And: would it be useful to differentiate between issues arising from changes in the context in which we operate (our socio-political contexts) and the ones arising from the changes in function and structure in our network organization as it evolves ?
5. Does such enhanced understanding help us in identifying more effective strategies to deal with the key or priority issues ?
6. Is it possible or desirable to identify collaborative “regional” learning, sharing and support activities to assist each other in the implementation of these more effective strategies ?

We’ll try to come up with a workshop process that will enable participants to answer these questions, based on their own experiences, largely through working groups with varying composition (depending on the question at hand).

The workshop facilitators will also attempt to come up with additional ideas and topics for each of the key questions so as to guide the discussions in the working groups.
A more detailed program will be presented at the beginning of the workshop.

We plan to offer a field trip on day 3 of the workshop (on Wednesday 11 April) so as to provide an opportunity for participants to practice and observe ‘networking in the field’.

Preparation before the workshop

We would like you to fill in the 'questionnaire on network efficiency' and send that to us by email or fax as soon as possible. If you did not get the questionnaire earlier plse ask for a copy from Bee at ftcffs@ku.ac.th

Also plse select some of your most informative reports or publications, giving a good insight into what the network is trying to achieve, how it tries to do that and bring them along for display or sharing with other participants.

Plse prepare one (1!) flipchart showing the structure and functions of the network you are involved in, for display on day 1.

Confirm your travel details to Bee.

Travel arrangements

1. Participants are asked to arrange their own travel through the most economical route. Travel costs will be reimbursed based on receipt from the agency from which tickets were purchased. Plse note that RECOFTC's financial policy and rules do not allow reimbursement without such receipt.
2. If you want RECOFTC to make your travel arrangements, plse contact Bee.
3. Book your flights so that you arrive by Sunday 8 April and depart by Friday 13 April (or Saturday 14 April in case you don't believe in flying on Fridays 13s ?).
4. Upon arrival at Bangkok airport, plse follow the signs 'public taxi', go outside the arrival building and take a taxi to RECOFTC, at Kasetsart University, Ngamwongwan Road, Bangkhen. Bee will send you instructions for the taxi in Thai, upon receipt of confirmation of your participation. Note that taxis from the airport add 50 Baht extra to the charge on the meter. Charges for the ride from the airport vary according to the traffic situation but should not be more than 150 to 200 Baht (including surcharge). Make sure you change some money to get about 500 Baht in 100 Baht notes in the arrival hall.
5. Upon check in at RECOFTC you will receive information on where you can have your breakfast and other logistics.
6. RECOFTC will meet the costs of accommodation and lunch directly and will issue a small allowance to meet your costs of breakfast and dinner, and lumpsum compensation for additional travel costs (taxis etc.) of 100 US $. If more costs than that were made these can be reimbursed upon show of receipt.

Any questions

Plse ask Bee (aka Ferngfa Panupitak) or any of us mentioned below.

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List of Participants

List of Participants
Facilitating Support Networks in Community Forestry Development Workshop
9-12 April, 2001,Bangkok,Thailand

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Workshop agenda

Daily Agenda

Facilitating Support Networks in Community Forestry Development Workshop

April 8-12 2001

Time	Topic	Objectives	Method	Who/Materials
Monday 8th April				
9.00	Opening and Welcome	✓ To welcome all and start meeting ✓ To clarify admin/accomodation arrangements ✓ Display of materials; how to display and copy etc		Cor/Alan Bee
9.15-9.45	Introductions of participants	✓ To enable participants to know each other	Question and answer game; networking for information	Karen
9.45-10.00	Expectations and setting norms	✓ To clarify how participants expectations relate to the workshop as planned ✓ To establish some group rules to ensure optimal group process	Post-its and clustering Brainstorming in buzz groups	Karen/post-its, markers, flips
10.00-10.30	Introducing the workshop objectives and flow (linking with expectations)	✓ To explain the proposed flow, objectives and components of the meeting ✓ To invite participants to comment and add what	Flip chart presentation and plenary discussion (need to ensure here that particpants clear about logic of CF development and organisational analysis etc) Clarify open space day	Karen/ Prepared Flip Charts

		else they would like to see covered in the agenda		
10.30-10.45	COFFEE			
10.45-12.00	Networks and networking: from ideas to impact	✓ Stimulate identification by participants of what are networks and why are they formed ✓ Provide opportunities for participants themselves to relate what their network is/was and why was it formed ✓ Will help introduce who is from what network etc	1. presentation 2. interactive exercise	Alan
12.00-1.30	LUNCH			
1.30-3.00	Network structure and function	✓ To discuss network organisation	Working Groups to how networks operate and their design	Working Groups
3.00-3.15	COFFEE			
3.00-4.00		✓ To discuss network organisation	Working Groups to present ideas to all	Alan
4.00-4.30	Wrap-up of Day	✓ To summarise the main outcomes of the day	Presentation/summary	Cor
4.30-5.00	Feedback	✓ To get feedback from participants about process during the day	Interactive method	Karen

Tuesday 9th April 2001

Time	Topic	Objectives	Method	Who/Materials
9.00	Introduction to the Day	✓ To provide overview of proposed agenda and opportunity for comments ✓ To respond to feedback of previous day	Whiteboard Feedback flips Remind re open space opportunity	Karen and feedback volunteer
9.15-10.00	Network evolution and organizational development	✓ To provide a framework to participants of network evolution and linkage with organizational development ✓ To identify which networks represented by participants have been through different phases of evolution?	1. Presentation 2. Open discussion	Alan
10.00-12.00	Thinking about your networks evolution	✓ Participants identify phases of their own network ✓ Participants identify which factors characterize which phase	1.individual network groups 2.pairing up for probing 3.sharing on flipcharts	Alan
12.00-1.30	LUNCH			

Time	Topic	Objectives	Method	Who/Materials
1.30-3.00	Network evolution	✓ To discuss the morning's discussions and put in into the context of participants' experiences	Working groups analysing network structure in relation to evolutionary phases	Working Groups
3.00-	COFFEE			

Time	Topic	Objectives	Method	Who/Materials
3.15				
3.15-4.30	Network evolution	✓ Continuation of above	Continuation of above	Working Groups
4.30-5.00		✓ Summary ✓ Feedback	Summary Plans for next day open space (inc need for facilitators) Feedback	Karen

Wednesday 11th April

Time	Topic	Objectives	Method	Who/Materials
9.00-9.30	Indicators of success	✓ To introduce the idea of evaluation of networks	Short presentation	Karen
9.30-10.30	Indicators of success	✓ To discuss practical examples of how network evaluation operates	Presentation and open discussion	Alan
10.30-10.45	COFFEE			
10.45-12.00 1.30-4.30	Indicators of success	Enable participants experiences and ideas to be incorporated into evaluation strategies	Working groups to give suggestions of how impact can and should be measured	Working groups
4.30-5.00	Day's evaluation		Method to be identified.	Karen

Thursday 12th April

Time	Topic	Objectives	Method	Who/Materials
9.00	Introduction to the Day	✓ To provide overview of proposed agenda and opportunity for comments ✓ To respond to feedback of previous day	Whiteboard Feedback flips Remind re open space opportunity	Karen
9.15-	Strategies for	✓ To look at lessons	Presentation and open discussion	Alan

Time	Topic	Objectives	Method	Who/Materials
11.00	success	learned and identify means of incorporating them in future activities		
11.00-12.00	Incorporation of network strategies	✓ Participants work on their networking experiences and look at means of incorporating new ideas	1.individual network groups 2.pairing up for probing 3.sharing on flipcharts	Alan
12.00-1.30	LUNCH			
1.30-4.00	Wrap-up of workshop	Tie-in all ideas from the workshop and look at main outcomes	Flipchart Group feedback via “fishbowl”	Alan/Karen/Cor Group

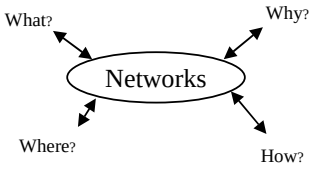
Presentation 1: Networks and networking – from ideas to impact

Networks and networking

- from ideas to impact

Objective

To start **thinking** about the ideas surrounding networks



What is a Network?

- "A network is a **partnership** of individuals and/or organisations **pursuing shared goals**"
- "Networks actively seek **relationships** with others to **exchange knowledge**"
- "A network represents a **community of ideas**"

What is a network?

- Alan: *"A group of people working towards a common goal"*
- Cor:
- Karen:
- Kubo:

Why network?

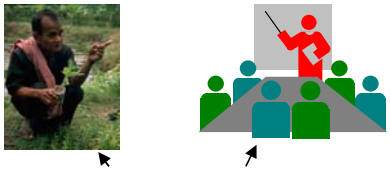
Why network?

- History
  - Networking → Networks
    - recognition of complexity and similarity of issues
    - increasing ability to collaborate
  - how do Ns emerge?
  - role of donors and coordinators
- Development of networks in the 21st century

Why network?

Networks create an environment where we can accomplish together more than can be done as individuals or single organisations alone

How do networks come into being?



Where do the ideas come from?

How do networks come into being?

- Who has the ideas?
- Who makes the decisions?

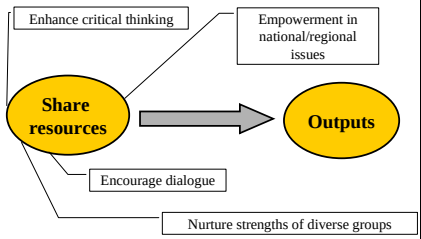
} Grass-roots or donors?

- What are the reasons for starting networks?

Questionnaire results

Participation/ democracy
Organisational development
International status

Why do networks work?



Why so many networks?

Is it because they are effective?

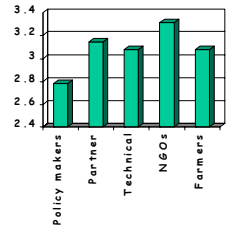
OR

Is it because they are easy to establish and look good to donors?

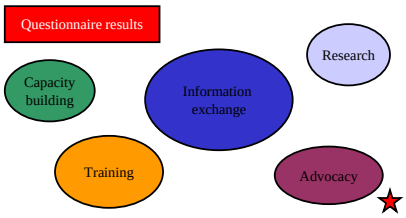
Who are our targets?

4 = very important
3 = important
2 = fairly important
1 = not important

Questionnaire results



What are we looking for?



What are the main problems?

Lack of donor support

No clear direction of the network

Lack of access to information

Lack of staff/capacity

Questionnaire results

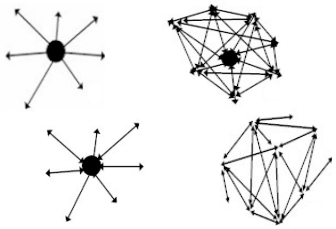
Negative image

Lack of participation

Infrequent meetings

Resource allocation

What do networks look like?



Donor driven or donor creation?

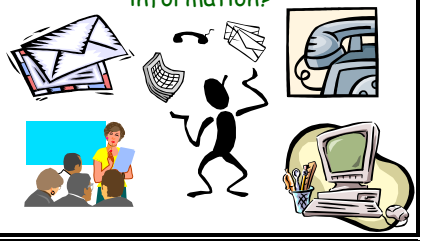
Donor decides evaluation criteria

Donor decides objectives

Donor says it has done a good job!

How much donor influence do we want?

Common knowledge : how do we share and store information?



Who is in control?

?

Centralised power and control

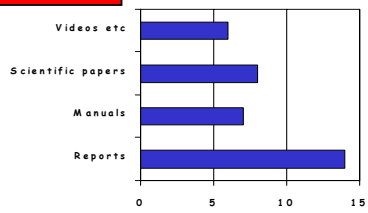
Decentralised participation

How do we measure success?

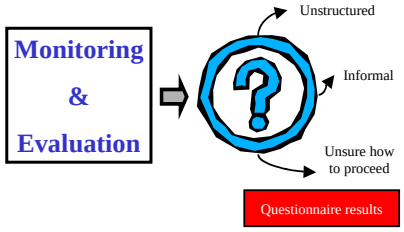
- Measuring the immeasurable?
- Indicators

Managing for outputs

Questionnaire results



Managing for impact



One medicine cannot cure all patients

We are looking at a range of solutions

Presentation 2: Network evolution

Network evolution

Objective

- To describe the evolution of your network.
- To identify the developmental stage that you are at with your network.
- To highlight the skills and tools needed to progress.

Where you are and where you are going

The Forages for Smallholders Programme (FSP)

- Outline
  - The objective of this project is to improve the livelihoods of resource-poor farmers in southeast Asia through the increased uptake of high quality tree fodder on farms
  - Age = 5 years
  - Works through a collaboration between local, national and international organisations.

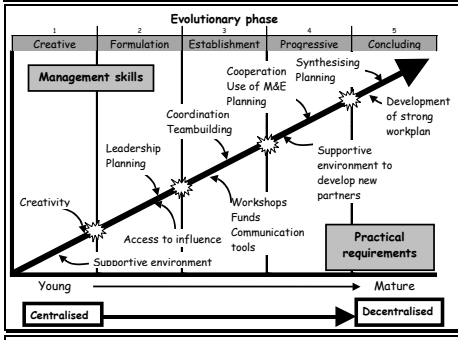
FSP

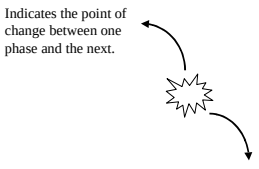
Calliandra Leucaena

Gliricidia

FSP

1 Development of the idea
2 Getting support for the idea
3 Establishing the network
4 Inclusion of new partners
5 Self-sustainability





Certain key skills and practical requirements are needed to move from one phase and the next.

Exercise

In working groups :

- determine which evolutionary phase represents your network
- decide what key skills and practical requirements are needed to move to the next phase

Presentation 3: Indicators of success

Indicators of success

Why evaluate?

- Accountability to all stakeholders
- Learning process leading to improvements (self-learning)

Problems with evaluation of networks

- the political nature of networking
- the broad and long-term goals
- and the difficulty in drawing direct relationships between activities and impacts

Examples of benefits of networks that are difficult to measure

- stimulating research, initiatives and skills
- promotion and supporting new initiatives
- putting people and groups in touch with each other
- encouraging and generating new leadership
- breaking the isolation of individual efforts

FSP evaluation

- Range of evaluation criteria
  - quantifiable
    - numbers of participants
    - numbers of nurseries, trees etc
  - un-quantifiable
    - 'client satisfaction'
      - views of participants on issues such as improvements in standards of living and plans for their futures.

Who are we evaluating for?

- Donors
- Coordinators
- Intermediaries
- End users

Evaluation criteria

- Simple
  - outputs
  - financial return
  - network participation (numbers)
- Complex
  - outcomes
  - trust
  - network
  - participation (gender, age)
  - participation (dynamics)
  - increased political status

Exercise

- In working groups
  - decide which criteria are important for evaluating the success of your network, and
  - how you will carry out the evaluation

Presentation 4: Strategies for success

Strategies for success

Strategies for success

STRATEGY FOR IMPROVING NETWORKS
(Objective of exercise: fill in blanks. Example given in first row.)

PROCESS			IMPACT		
What works	Indicators	How?	Objectives of network	Indicators	How?
Identification of objectives	List of objectives developed by all partners	Workshops/meetings/ Visits to find out objectives of partners	Greater participation in network	Number of participants	Working with new partners - Improving dissemination - Increasing participation
Development of clear work plan					
Good coordinators(s)					
Participation by members at all levels					
Good means of exchanging information					
Flexibility to change					
Ownership by members					
Adequate resources					

Where do we go from here?

- We have looked at:
  - What is a network?
  - The evolution of networks
  - What makes networks work/fail?
- Next step…….Putting it into action

Questionnaire on network efficiency

DFID & RECOFTC:

Questionnaire on network efficiency

BACKGROUND

The Regional Community Forestry Training Centre (RECOFTC) and the UK Department for International Development (DFID) aim to support the effectiveness of collaborative arrangements (networks, working groups, etc.) in participatory forestry. We are planning a workshop on this to be held 14-16 March, 2001, (see accompanying information note). If you are interested in participating in this workshop please complete this questionnaire. Results from all participants will be used to help prepare the workshop sessions. Please return the completed questionnaire by email to Cor Veer at ftccor@ku.ac.th before January 25, 2001. The questionnaire is being sent to a wide range of partners involved in supporting or facilitating such collaborative arrangements. All results will be treated in confidence.

Many thanks for your cooperation.

Cor Veer **&** **Alan Pottinger**

RECOFTC — Senior Research Associate

Kasetsart University — CNRD

Box 1111 — Green College

Bangkok 10903 — Woodstock Road

Thailand — University of Oxford

UK

ftccor@ku.ac.th — Alan.Pottinger@green.ox.ac.uk

- NOTE: the questionnaire can be filled in as a Microsoft Word document, and e-mailed back to Cor. Or it can be printed out and completed in the normal way and faxed back. Please tick the relevant box(es), unless otherwise indicated. Please feel free to add any additional comments.

Questionnaire on network efficiency

A. CONTACT DETAILS

A1. The contact person for follow-up queries relating to this questionnaire is:

Name
Job Title
Organisation
E-mail

B. BASIC NETWORK INFORMATION

B1. Network details

Network name
Funding source(s)

B2. Who/which organisation manages the network?

Comments:

B3. What is the main purpose(s) of the network?

	Research
	Information production and dissemination
	Training
	Development
	Other (please specify)

Comments:

B4. How many participants are involved in the network?

Number (approx.)	
	Donor agencies
	Management/coordinating agencies
	NGOs/CBOs

	Target groups More than 1500 households (users) are involved
	Other (please specify)

Comments:

B5. Which target audiences are seen as the main priority in the network?

Score	
	Policy makers and senior management for forestry NGOs platform
	Partner organisations for NGOs Roundtable
	Technical staff involved in project planning & management
	NGOs and CBOs for SNI
	Farmers and users for JFMCs
	Other (please specify)

Score as follows: 4 = very important priority 3 = important 2 = fairly important 1 = not important

Comments:

C. PRIORITY SETTNG AND PLANNING

C1. What are the objectives of the network?

C2. Which organisations were involved in initial priority setting?

Comments:

C3. Do you feel that other stakeholders should have been involved in priority setting? If so, who?

Comments:

C4. Do you think that the objectives are clear to all participants in the network?

Comments:

C5. Do you think that there is a clear strategy for achieving the objectives of the network?

Comments:

C6. Are the objectives reviewed? If so, by whom?

D. NETWORK RESULTS

D1. What are the expected outputs from the network?

D2. What are the actual outputs from the network?

Comments:

D3. Are the actual outputs better than the expected ones?

Comments:

D4. If not, what can be done to improve the situation?

D5. Are there any negative outputs?

Comments:

D6. What is the motivation for participants in the network to continue?

Comments:

E. NETWORK STRUCTURE

E1. Who do you collaborate with in the network?

Score

☐ Policy makers and senior management

	Partner organisations
	Technical staff involved in project planning & management
	NGOs
	Farmers and users
	Other (please specify)

Score as follows: 5 = more frequently than once each month 4 = about once each month 3 = a few times each year 2 = approximately once each year 1 = once in the life of the network 0=never

Comments:

E2. How do you collaborate with other partners in the network?

	Which partner
At regular meetings	
Visits	
By email	
Fax	
Post	
Telephone	
Other (please specify)	

Comments:

E3. How and where are decisions made about the network?

Comments:

E4. Are management structures discussed/reviewed? If so, by whom?

Comments:

E5. Can all network participants participate in management decisions?

Comments:

E6. Is there clear and strong leadership ?

Comments:

E7. What is the main problem with the network?

Comments:

E8. How should this/these problem/s be addressed?

Comments:

E9. Do you think this will happen? If not, why?

Comments:

E10. Do you think that network objective(s) could have been achieved in a better way?

Comments:

F. PERFORMANCE EVALUATION

F5. What outputs* are produced by the network, and to whom are they targeted?

✓	
	Reports
	Manuals or leaflets
	Scientific papers
	Videos and other audio-visual outputs

**Please specify:*

F2. How is network performance measured? (i.e. what indicators of success are used?)

F3. Do you think this is a good way of measuring success?

Comments:

F4. Do you think other partners think this is a good way of measuring success?

Comments:

F5. How could performance assessment be improved?

Comments:

F6. Are any formal mechanisms in place to make sure that lessons from evaluations are taken properly into account?

- ☐ Specific evidence of lesson learning is required in new spending proposals
- ☐ Senior management are expected to respond to evaluation findings & recommendations
- ☐ Evaluation unit staff are involved in the review & approval of new spending proposals
- ☐ Recipient countries are expected to respond to evaluation findings & recommendations
- ☐ No formal mechanisms exist
- ☐ Other *(please specify):*

Comments:

G. THE FUTURE

G1. How do you think the network will develop in the future (i.e. where do you think the network will be in 1 year, 5 years, 10 years?).

Thank you very much for your assistance in completing the questionnaire.

Workshop evaluation

What was the most interesting key points of network success in the group?

- impact of network is the key for success
- need to recognize there are different types of networks
- need to consider level of impact at different levels
- impact may not happen directly but through other means
- accountability, ownership of network and flexibility to adjust to environment
- network transforms from time to time, one time of success should not be concluded as success
- difficult to make strategic planning for networks
- strategic planning helps make clear sense of direction

How will you use your understanding of network evolution in your work?

- how to kill unfunctioning network
- help to manage the network more systematically, clarify roles and responsibilities
- merits and demerits of network for organization are clear now
- knowing how to analyze network, try to reflect to own network
- in many cases small group of people define objectives so not many can be involved, but strategic planning help function network through involving as many people as possible
- realized that the end of networks is not necessarily the failure
- networking transforms from social movement to organization or something
- networking is something like forest ecosystem with diverse movement and flowing

What your ideas on what networks cannot do?

- network cannot intervene an another space of works and change policy either
- network does not work if objectives are not clear
- if there are conflicting issues among network members, it does not work
- without cooperation and management
- without ownership
- without information and financial support
- cannot satisfy all demands and respond to changing environment
- there are always multiple objectives but only some of them can be achieved
- (can do) bring resources to change policy ; (cannot do) change policy
- if persons are required to make full time involvement, it does not work
- cannot force members
- it does not work if members are not clear in objectives
- persons' commitment is prerequisite

APPENDIX 3

Key informant interviews

Helen Altshul	Univ. of Greenwich
Mike Arnold	Independent consultant
Heather Crompton	ACIAR
Oscar Eyog-Matig	IPGRI
Masa Iwanaga	IPGRI
Brigitte Laliberté	IPGRI
Chun K Lai	ICRAF, formerly APAN
Steve Midgley	CSIRO
C.T.S. Nair	FAO, formerly FORSPAR
Pat Norrish	Independent Consultant
Abdou Salam Ouedraogo	IPGRI
Oudara Souvannavong	FAO
Gill Shepherd	ODI
Wyn Richards	NR International
Tony Simons	ICRAF
Imke Thormann	IPGRI
Jane Thornback	ETFRN & UKTFF
Joseph Turok	EUFORGEN
Jamie Watts	IPGRI
Karen Wilkin	NR International
Peter Wood	Independent consultant